FIRMINGER'S

MANUAL OF GARDENING

FOR

BENGAL AND UPPER INDIA.

Revised, corrected, and amplified

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PREFACE TO FOURTH EDITION.

In bringing out the present Edition of this work, I have been actuated by a desire to place before the public an old friend with a somewhat altered character; for notwithstanding several recent hand-books on Indian Gardening that have made their appearance, "Firminger" still retains its original place in the affections of Anglo-Indian Horticulturists. As a complete Manual on all that pertains to Gardening in all of its branches, I do not know of any other book that at all compares with it.

I am, however, conscious that the task of revision might have been placed in abler hands. This is no hackneyed phrase, but a genuine acknowledgment. But having waited in vain for some one else to undertake the work, it was suggested to the enterprising Publishers that they might entrust it to me. Having a somewhat extensive experience of Indian Horticulture, while in charge for several years of one of the finest public gardens in India, I undertook the work, with what result I will leave to an indulgent public to pronounce.

It will be seen that the general plan of the book has been considerably altered. It is now divided into four parts, *viz.* (1) the operations of gardening; (2) the vegetable garden; (3) the fruit garden; and (4) the flower garden. An Appendix, alphabetically arranged, and fully descriptive, has been added, in which are included the recent introductions among flowering and ornamental-leaved plants. It is impossible, however, to describe every plant that has been introduced, for the simple reason that, owing to improved methods of conveyance and shipping facilities, the list is being added to every day. In fact, there are so many now in the field where there were only a few scarcely a decade back, and Horticulture in India has advanced in so remarkable a manner in recent years, that any attempt to tabulate and describe every new introduction would necessitate the revision of a book every six months, which of course is out of the question. But every endeavour has been made to bring the present edition up to date as far as it was possible to do so in the limited time at my disposal, and while placed out of the reach of a well-stocked botanical garden or nursery.

Among the additions will be found a calendar of operations for hill stations; with new chapters, dealing in considerable detail, on grass conservatories, orchid houses, fernery and propagating frames, with illustrations; as well as other important operations of gardening, including a chapter on: How to lay out and stock a Fruit Garden.

The largest additions will be found in Part IV, where new chapters have been written on all the more important genera, *e.g.*, Ferns, Orchids, Mosses, Roses, and the extensive order of Aroids, as well as Palms, Crotons, &c. I have also endeavoured, where I deemed it desirable, to give directions for cultivation on the Hills. In a word, a comparison of the present with the last edition will show at once what has been done to render the work in every respect complete; while several new illustrations have been added.

I have not had occasion to alter the botanical arrangement very materially; although where necessary I have changed the old names of plants in accordance with Bentham and Hooker's *Genera Plantarum*, which I believe is the most authoritative work on botanical nomenclature. The object I have had in view has been to present to the public a Manual of Gardening, and not a botanical treatise; but this idea I have not been able to carry out as fully as I should have liked without entirely changing the whole character of the work. I am therefore conscious of many errors and omissions, which I fear are unavoidable in a production of this scope and nature.

I may be pardoned for noting here as a curious coincidence that the late Revd. Thos. Firminger and my late father were well known to each other at Ferozepore, in the Punjab, and used to compare notes together on matters horticultural. That it should have fallen to me to revise Mr. Firminger's book is somewhat curious.

In conclusion, I must tender my acknowledgments in the first place to Mr. R. Blechynden, junior, Deputy Secretary to the Agri-Horticultural Society of Calcutta, for the ready courtesy with which he placed at my disposal any works of reference I needed from among the fine collection owned by the Society. Next, to Dr. George King, Director, and Dr. David Prain, Superintendent of the Herbarium, of the Royal Botanical Gardens, Seebpore, for their readiness in supplying me with certain information regarding plants. For the rest, the work of revising, editing, and passing the book through the Press has been done by myself unaided, in the midst of duties of a most exacting and arduous nature. I therefore trust that my critics will "let me down gently."

H. St. JOHN JACKSON.

Allahabad, *July 7th, 1890.*

PREFACE TO THIRD EDITION.

THE present Edition of this work, though an endeavour has been made to condense it by the suppression of particulars of less importance, will be found to contain about twenty pages more than the last. As regards, however, the great bulk of the matter contained in it, it will be found otherwise to differ little. In fact there was little perhaps to call for much alteration. The great desideratum was to notice and describe as far as possible the plants that have been newly introduced. These, though many in number, comprise for the most part such as are remarkable for their foliage, as well as those the cultivation of which can only be conducted successfully in the Betel-house. The most of these I believe I have been enabled to specify, and several of them to describe either in the body of the work or at p. 594, at its close.

For corrections and additional information in the description of the Orchids I owe my best thanks again to Mr. S. Jennings. For the advantage also that I have taken of the valuable contributions of Mr. John Scott to

the 'Journal of the Agri-Horticultural Society,' I hope I may count upon his kind indulgence. It may be as well, too, here to state that, much as I have drawn in the way of information from the writings of others, I have never paraphrased it and passed it off as original, but invariably given it in their own words. Nor should I, in common honesty, have considered myself entitled to make use of information so derived at all if, of whatever benefit it might be to me, I saw that it could by any possibility be attended with loss or injustice to them.

September 1874.

PREFACE TO SECOND EDITION.

SINCE the issue of the former Edition of this work, circumstances have occurred affecting matters of gardening in India, which I feel called upon to notice. Lower Bengal has been visited by two violent cyclones, which have caused devastation in all gardens, public and private, and destroyed, either entirely or nearly so, many of the plants I had described. Now upon this account merely, I have not seen the necessity of altering what was already written respecting them. My object was to describe them such as I had known them to exist and thrive in this country, and this object would not be affected by any accident that might subsequently befall them. Upon the same consideration I let remain what I had stated respecting plants in the gardens of the Agri-Horticultural Society; although on the ground being reclaimed by Government, the plants have no existence there now.

On the other hand, again, many new plants have, within these two or three years past, been introduced, of which I have not had the opportunity of gaining knowledge.

But the possession of these is confined to few; and I believe that those, of which an account is here given, comprise all that are likely to be met with in most gardens. The main points, then, in which this Edition differs from the preceding, is in the correction of some few errors, and in the addition of some important particulars, more especially with regard to fruit culture.

I wish here also to record the obligations I have been laid under. To Mr. Errington, Head-gardener of the Agri-Horticultural Society, I am much indebted for some most useful information he kindly communicated to me. For a valuable communication upon the Oranges of Nagpore, I have here to offer my best thanks to Mr. A. Ross. To Dr. G. Henderson I am especially obliged for the kindness and readiness with which he replied to all questions I troubled him with upon matters of Gardening in the Punjab; and to Mr. S. Jennings, of Dum-Dum, I am under great obligations for the generous assistance he afforded me, in particular with regard to Caladiums and Orchids. Lastly, I have to acknowledge some few particulars of interest I was enabled to glean from the MS. Notebook of the late General F. Jenkins, which he kindly placed at my disposal.

April 1869.

PREFACE TO FIRST EDITION.

THE want of a practical and comprehensive work upon Gardening, expressly adapted to this country, has been much felt, I believe, by all who have had the management of a garden in India. The Agricultural and Horticultural Society of India indeed have long since acknowledged the existence of such a want, by the offers they have repeatedly made of a premium for the best treatise upon the subject that should be presented to them before a certain stated time. These offers have in no single instance met with a response.

It was not till, after every inquiry possible, I had ascertained that there was no prospect whatever of a work of the kind being undertaken by some other hand, that I resolved upon commencing one myself, and placing before the public such amount of information as, during my hours of recreation and leisure, I have been able to collect upon the subject.

By a residence of several years at Ferozepore, I had made myself well acquainted with the cultivation of a

garden in the North-West Provinces; when, on removal to Howrah, by the practical knowledge I acquired in my own garden, as well as by observation of what was done in others I had the means of visiting, I became thoroughly conversant with the practice of gardening as applicable to Bengal. The ready access also that I then had, both to the Government Botanical Garden and to those of the Agri-Horticultural Society, served to put within my reach much very important information concerning numerous plants, which I could not otherwise have obtained. The appointment, moreover, I held during six years as one of the judges at the horticultural shows at Calcutta, served to render me familiar with the finest productions of the country, in the way of vegetables, fruits, and flowers exhibited there during the colder months.

It is still not without considerable diffidence that I venture on submitting these pages to the press. No one can be more thoroughly aware than myself of many deficiencies with which they must unavoidably be chargeable: but working single-handed; gathering, often under great difficulty, my facts for myself; not taking any statement upon trust, which by subsequent trial I had the means of verifying; and with the labours of no predecessor to be of any material assistance to me, I can only hope for indulgence, if in some instances the information I impart be not so full as might be desired, and if in some few perhaps I prove wrong or mistaken.

Of the works to which I have mainly made reference, I should not omit mention of the 'Hortus Calcuttensis' of Dr. Voigt. In this catalogue, however, are enumerated many plants that do not exist in the country, and of which there appears strong reason to doubt whether they ever have done so; while many of the most ornamental ones we now possess are not found there, having been introduced since the work was compiled. The 'Flora Indica' of Dr. Roxburgh also I have made free use of, whenever it served me. Dr. Roxburgh's remarks on any plant he has described are almost invariably accurate and excellent, except that, owing perhaps to long residence in India, the merit he attaches to most of its vegetable productions may be somewhat overrated. For the copious and frequent use I have made of the valuable writings of Sir J. Paxton and Dr. Lindley, no apology, I trust, will be required. I need hardly notice the Transactions and Journals of the Agricultural and Horticultural Society of India, as a source likewise upon which I have drawn largely. The whole of those volumes I have thoroughly searched. and extracted from them all that I found of any valu for my purpose. On no occasion, however, have borrowed either from them, or from any other authority without the fullest acknowledgment. All description of plants that I have given, have been, unless otherwise stated or implied, from my own observation of them in this country. I have been scrupulously car

not to set down any plant as to be met with in India, of the existence of which there I have not had positive knowledge. On the other hand, if there are some plants occasionally to be found in gardens of which I have failed to give account, in most cases it has been because I have not considered them sufficiently ornamental to merit a place there; some few possibly may have escaped me.

I should be very remiss were I not in this place to name Mr. Robert Scott, of the Government Botanical Gardens, as one to whom I am under very considerable obligations for the liberal and unreserved way in which he has always supplied me with particulars respecting any plant about which I have made inquiry. To Mr. A. H. Blechynden, likewise, the able and courteous Secretary of the Agri-Horticultural Society, I have here to tender my best thanks for the kind aid and encouragement he has uniformly afforded me during the progress of this work.

There remain now only a few words to add with respect to the general arrangement I have adopted. For the convenience of reference, the ornamental annuals have been kept in a group separate from plants of perennial duration. For the same reason the nut and fruit-bearing plants have been placed in groups apart from each other. The classification followed is that given in the last edition of Dr. Lindley's 'Vegetable Kingdom.' Where any plant is described, type

of three distinct kinds has been used for the names placed at the heading; according as it is the Latin, European, or Native one that is denoted. For example, as in **Mirabilis Jalapa**—MARVEL OF PERU—*Gool-ubbâs*, the name printed in black type denotes uniformly the Latin, the second in capitals the European, and the one in italics the Native one.

CHINSURAH, *March 1863.*

CONTENTS.

	Page.
Introduction	1
PART I.	
The Operations of Gardening	7
PART II.	
The Vegetable Garden	119
PART III.	
The Fruit Garden	179
PART IV.	
The Flower Garden	285
Appendix	622
Index to English Names of Plants and General Index ...	641
Index to Latin Names of Orders, Genera and Species ...	647
Index to Native Names of Plants	661

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A MANUAL OF GARDENING

FOR

BENGAL AND UPPER INDIA.

INTRODUCTION.

UNDER the most favourable point of view it can hardly be said that horticulture has as yet made much advancement in India. Of the natives, those of the higher class, it would seem, have never manifested much fondness for it, nor taken much interest in the pursuit; while those who follow it for a livelihood have not found it sufficiently remunerative to devote to it more than the least possible of their time and thought. Of this we have the plainest evidence, look in whatever direction we may. The flowers they prize are confined to only a limited few; and those not especially for their beauty, but from having been consecrated from time immemorial to certain religious or festive purposes. And so, again, in regard to the fruit that we see exposed in vast quantities for sale in the bazârs, it is always the most inferior of its kind. The Mangos, Guavas, Pine-Apples, and Plantains are uniformly of all but the very worst description. That this should be the case no adequate reason can be assigned, but the want of a very trifling amount of care and attention bestowed upon the cultivation of better sorts. This little care and attention, it does not appear that they think it worth their while to bestow. Their fruit-trees, generally, are such as have sprung up on the spot, where the seed of some worthless kind has been casually dropped or cast away; and although the seed of a fine sort does not invariably produce a tree of equal excellence to the one that bore it, from the seed of a bad sort can only be expected a tree that will yield fruit no better than that of its parent. Not only is it thus, however, that their trees are multiplied; but as they grow up they are left altogether neglected, densely crowded, perhaps among others of their own kind, or choked up in the midst of different kinds of jungle-trees.

There are in the country, it is true, gardens in possession of the wealthier natives, where fruit-trees of choice kinds are to be found, and

where some slight attention is bestowed upon them, but such gardens are comparatively very few; and even in gardens such as these, of the vegetable productions that belong to the country, there are none that possess any high merit, but what has been at some time owing to a mere sport of nature, wholly unaided by the hand of man. Cultivation to the extent of pruning and manuring undoubtedly is practised, but anything like a careful and persevering endeavour to surpass in any instance what has already been done before, seems never to be contemplated. By many even the simple operation of budding is regarded with superstitious aversion; and as for the methods of hybridizing, crossing, or the more easy one of "repeated selection," whereby cultivators in Europe are continually raising vegetables, fruits, and flowers of a better description, any such proceeding is altogether unknown.

Nor of Europeans, moreover, can it be affirmed during the long time they have been resident in India, that they have done much, save in the introduction of new plants, towards the advancement of horticulture. The mere ordinary operations of working the soil, watering, highly manuring, pruning, and inarching are all that has been done; no efforts have been made to improve the races of plants indigenous to the country; no attempt, by any of the more refined processes of science, to produce superior varieties. It has been stated that the fine varieties of Mango, for which one locality in Bombay is famous, have resulted from the skill bestowed upon their culture by the Europeans who first settled in that part of India—an assertion that rests upon very slender foundations; and this is the only instance, I believe, where it is even pretended that an improved variety of fruit has been produced in India by the art of the cultivator.

At the Government Botanical Gardens at Seebpore, near Calcutta, for a period of very many years, there has been a constant accession of plants of every description, brought from all regions of the world, as well as from every part of India. From this establishment plants and seeds were formerly distributed gratuitously to all who applied for them. This was not only a very great boon to the individual applicants, but a great benefit to India generally, since many most valuable plants became thus in a very short time thoroughly established, and all but naturalized in the country. This gratuitous distribution, however, was eventually considered to be attended with abuse; in the first place, because some persons applied for plants who, obtaining them for nothing, set no value on them when they got them; and secondly, because so long as plants could thus be obtained for nothing, no encouragement was given to native nurserymen to cultivate them for sale. The distribution was, therefore, discontinued.

The Government Botanical Gardens at Saharunpore have done for the North-West Provinces what the Botanical Gardens at Calcutta have

done for Bengal. Seeds and plants have been issued from them without charge to all, indiscriminately, who have applied for them. This has proved a great public benefit. Indeed, without such a resource to draw upon, private gardens could hardly have been kept up with any degree of satisfaction.

Next, the Agricultural and Horticultural Society of India, which, though it has, it is true, effected comparatively little as regards the importation of new plants, has been of considerable benefit to India, by the abundant supplies of seeds of flowering annuals and culinary vegetables that it distributes each year to its members, as well as by the gratuitous issue of ornamental plants, and the sale of fruit-trees from its garden. By means also of the exhibitions of flowers, fruits, and vegetables that it holds annually, and at which prizes are liberally bestowed, it has created great emulation among the native cultivators around Calcutta. To this mainly is owing the abundant supply of remarkably fine vegetables that may be seen in the markets there during the cold months.

Branch societies had likewise been established in different parts of India. These have done much good during the time they have been in existence, by forming public gardens, holding horticultural shows, and distributing seeds and plants. But they have now become Government concerns.

And lastly, private individuals have contributed, as far as their limited means have allowed, to disseminate a taste for gardening by the attractiveness of the well-stocked and orderly-arranged gardens they have kept up, and by the display of the choice plants which, often at considerable expense, they have procured from distant quarters of the world. It is very sad, however, it must be confessed, to see gardens upon which have been bestowed great pains and labour during many years, and which were the admiration of all in the station where they were situated, become an utter waste and ruin, when, by any change of circumstances, their owners have been obliged to relinquish them. This nearly invariably happens. But a consideration such as this ought not any the more to deprive those who love a garden of the enjoyment of having one to last their own time at least, if it last no longer. For, leaving alone the benefit derived from the produce, so sweet a charm is there in all that appertains to the pursuit of gardening—the loveliness of the flowers with which in constant succession throughout the year one is surrounded—the fine perfume, varying with the varying seasons, with which, day and night, the air around the house is unceasingly scented—and, above all, the comfort and healthiness of living in premises from which absolute cleanliness and neatness are inseparable—that, happen to it whatever might afterwards, the present pleasure derived from a garden is ample enough to repay for all the cost and trouble expended on it.

A few words here may not be out of place regarding native cultivators, both in their character of mâlees and nurserymen.

First, then, no one should allow himself to suppose that he can have a well-kept, well-cultivated garden without being, to a considerable extent, his own head gardener. A garden left entirely in the hands of a mâlee will invariably be found in that dirty, neglected state so noticeable in the compounds around most European residences in India. It is useless to give only general orders to a native servant. The owner must, from time to time, scrutinize each particular operation of the garden, and give special directions how it is to be done, or, in many instances, it will not be done properly, if even it is done at all. Vexation and angry words will never set things right. The mâlees are generally very good servants if properly managed; but more must not be expected from them than really is in their nature. They follow gardening as their vocation, but they have no enthusiasm for it; and the interest they take in the work will always be just in proportion to the interest they see taken in it by their master. And they will become interested when they find that a master is so; when he pays them regularly, refrains from maltreating them or giving them abuse, co-operates with them, and shows them, now and then, with his own hand, what he wishes to have done. Let them see that you are their master in respect of knowing and being able to perform their work as well as, or better than, themselves, and you will find in them as good servants as are to be met with, perhaps, in any part of the world. They are exceedingly apt in acquiring knowledge; the retentiveness of their memory is indeed surprising. Several of those, for instance, employed in the Calcutta Botanical Gardens will remember, and, on being asked, be ready immediately to give, the scientific name of any plant in the vast collection there. And this is the more to be wondered at, as to them the meaning of the name being wholly unknown, the name itself cannot be suggested to their minds by any peculiarity of the plant that it denotes.

Many of the mâlees, too, about Calcutta are much more conversant with the scientific names of the plants they have to cultivate than the ordinary run of gardeners in England are. Unfortunately, they have been encouraged to attach far too great importance to this kind of knowledge. Those who possess it require higher wages in consequence; and, as far as my experience goes, often prove neglectful, indolent, and cunning. But apt as they are at learning, they have very little judgment withal. Even the apparently simple operation of administering water to a potted plant in exact accordance with its wants, it seems all but hopeless to make them comprehend—indeed, any operation of the garden that requires to be modified according to circumstances, appears to lie almost beyond their capacity. They adhere to one constant

uniform routine in all their work, from which they hardly have an idea of deviating, and from which it is only with great difficulty often that they can be brought to deviate.

In the year 1855, the Agri-Horticultural Society of India established a school in their garden. The boys, under the superintendence of their head gardener, Mr. McMurray, were to work in the garden morning and evening, so as to become acquainted with all the branches of practical gardening, and with the various experiments that are from time to time carried on with plants. In the day-time they were to study in the school under the native teachers writing, reading, arithmetic, mensuration, geography, and the elements of botany, so as to become intelligent gardeners. This scheme proved completely unsuccessful, and was abandoned after a very short trial. It was immediately seen that, though willing enough to receive the instruction thus imparted, the boys, on being educated, found avocations that they were enabled to follow far more lucrative than that of a mâlee; and thus the only object for which the schools were established was defeated. Indeed, the scheme was by no means a feasible one at the outset. It was hardly to be expected that to men in the humble sphere of the mâlee, much, if any, theoretical knowledge could be imparted. The judicious application of the theory of gardening is not to be acquired but by men of a liberal education, and of a class far above that of mere labourers, such as mâlees are. Horticulture among the natives will never be carried to any degree of excellence until native gentlemen acquire a fondness for the pursuit, become their own head gardeners, and overcome the scruples they now have of manipulating with their own hands. But a scheme for training mâlees in all the practical details of successful horticulture has worked with considerable success in the Saharunpore Botanical Gardens.

Native nurserymen of two classes are to be found rather numerously in the suburbs of Calcutta; those of the one class more properly may be termed market-gardeners, devoting themselves exclusively to the cultivation of vegetables for the Calcutta markets, and have their gardens principally at Bâgh-Bâzar, Mochee Khola, and the neighbourhood of Alipore. They cultivate most of the European vegetables during the cold months, and some, such as Cabbages, Cauliflowers, Knolkohl, and Carrots, they raise abundantly, and as near to perfection perhaps as these vegetables can be brought.

Those of the other class cultivate ornamental plants for sale, and have their little nursery-grounds principally in the locality called Mânik Tollah and Narcooldanga. The ordinary plants grown in Calcutta gardens may be purchased of them at a moderate price; but for choice plants they are apt to charge excessively.

A large number of natives also get a livelihood by carrying plants about Calcutta for sale at an exceedingly cheap rate. They are for the most part a very fraudulent class of men, demanding at first far more for a plant than it is worth, or than they ultimately are willing to take for it. They are also little to be depended upon. I have purchased from them for a high sum plants, and on opening the ball of earth supposed to enclose the roots, have found that I have been cheated with merely the end of a flowering branch cut off and stuck in a piece of clay.

Since the foregoing lines were written, a third and more important class of nurserymen have sprung up, not only in Calcutta, but in other large stations, such, for instance, as Bangalore; I refer to nurserymen who, having acquired a knowledge of the theory and practice of horticulture, have opened nurseries on an extensive scale, where choice and rare plants of every description may be had. These men import large numbers of plants from some of the leading nurserymen in England and elsewhere—Messrs. William Bull and James Veitch for instance; and plants which ten years ago it would have been almost impossible to procure anywhere in India, may now be had of these men. They have not only built grass-conservatories of large dimensions, and upon improved principles, but have also erected glass-houses for the better protection of rare and tender plants. In Calcutta, there are three such nurserymen—all natives, which fact in itself is an indication that horticulture in India has now made a fair start, and may be expected to progress rapidly now that the sons of the soil have taken the matter in hand earnestly. There is also now a growing tendency among the wealthier natives to surround their dwelling-houses with well-kept gardens, and but for this fact, and the growing taste among Europeans to possess gardens, it would have been impossible for this class of nurserymen to exist, with any prospect of a profitable livelihood. It is true that they charge very high prices for rare plants; but a glance at any of the catalogues of the leading nurserymen in England will convince the uninitiated that the Calcutta nurserymen are well within the mark,—it will even be found that in many instances their prices are far below those of English nurserymen. It is, however, possible that within the next decade, the prices charged by these men will be very sensibly reduced. At present, any one wishing to cultivate rare and choice plants, must go to these nurserymen for them, for they have outstripped the Agri-Horticultural Society of India in this respect,—in fact, I do not know of any gardens in India where they can be had in such numbers and variety, except, perhaps, the Royal Botanical Gardens, Seebpore; but here none but the commoner kinds can be had upon payment, the rarer and choicer varieties being reserved for the garden-collection.

CHAPTER I.

CLIMATE—SOILS—MANURES.

CLIMATE.

IN Bengal, what is called the "Cold-season," lasts, at the longest, not more than three months, commencing in November and ending by February. The temperature at night, during that period, at times, will fall as low as the freezing-point; but this is of rare occurrence. Towards the close of February commences the Hot-season, which lasts till about the middle of June, when the periodical rains usually set in. From March to May is the hottest period of the whole year. March and April are the driest months. Some time in June the Rainy-season begins, and lasts usually till about the 20th of October. The greatest humidity prevails in August and September. During these months, towards the evening, the atmosphere is filled with vapour almost to saturation.

The judicious gardener will, of course, conduct his operations in strictest reference to all these conditions of the climate.

During the cold months he will shelter his more delicate plants—those especially natives of a lower latitude—from the rapid transitions from heat to cold, and from cold to heat, which take place at that period of the year, hurtful alike to plant and man. To plants, likewise, that he sees have ceased from growth, and have entered into a state of temporary rest during these months, he will be most sparing in the application of water, which, in that condition, they cannot absorb and assimilate.

During the arid months that follow, when the soil becomes daily drier and harder, he will be liberal in his supply of water and surface-dressing to plants that, at that period, are in the full vigour of their growth, and especially to fruit-trees upon which the fruit is swelling.

When the rains are thoroughly set in and the air all but saturated with moisture, he will know that the season has come when plants, natives of this country, or of the same or lower latitude, may most safely be transplanted, as little evaporation then takes place from their leaves to exhaust them. For this reason also he will find it to be the time when plants of the same description may, with the greatest facility, be multiplied by cuttings, the soil itself being to them then as a hot-bed, and the dense body of moisture above acting as a hand-glass.

Again, at this season of the year, he will not be long in discovering, that to many of his more delicate plants nothing can be more fatal than alternate exposure to the violence of the rains and the fierce hot sunshine, that at intervals succeed each other then. With regard also to plants in the border, that are natives of a colder climate and that are in less vigorous growth at that period, he will also observe, in most instances, it is not the quantity of water that falls upon them in the way of rain, that is so injurious, but that which is allowed to lie and stagnate at their roots. For such plants, he will find a place in some gently elevated piece of ground, whence the water may be gradually carried off not long after it has fallen.

It is at this season, too, that he will find the greatest difficulty in the management of his potted plants, particularly the choice kinds that require the shelter of a verandah. Many of these, though not making growth, cannot dispense altogether with some amount of moisture in the soil; and of the water, applied from time to time for the purpose of insuring this necessary amount of moisture, that which does not pass off by drainage has, except in the most airy situations, a tendency to stagnate, insomuch as to cause the soil to turn sour and become covered with a rank, green mould, to the great detriment and often death of the plants.

And here may be mentioned one very striking fact, which every one will hardly fail of discovering after he has had but brief experience of gardening in India. It is, that there is a certain range of temperature adapted to each plant and each seed, beyond the limits of which the plant will not grow nor the seed germinate. Take, for instance, the common red Geranium and the Heliotrope: the power of growth in these plants, it will be observed, is as much suspended during the hot and rainy seasons in India as during the winter in Europe, the high temperature of the one climate and the low temperature of the other producing effects as near as possible alike. And so, likewise, with regard to certain seeds, the power of germinating will be found to lie dormant as long as the temperature remains above a certain height, as much so as when it is too low. The seeds of annuals, that in Europe will not germinate in the cold soil during winter, will likewise lie dormant in the overheated soil of India during the hot and rainy seasons, and will not germinate till the congenial cold of November has set in.

Towards the close of October, therefore, the gardener will be well aware that the time for him to be busiest has arrived. It is then that he will have to make his sowing of European annuals, and to put his kitchen-garden in forwardness for his crops of vegetables; and to re-pot and make preparations for propagating his choice plants, natives of a colder climate.

The climate of the Upper Provinces varies considerably from that of

Bengal, insomuch that many plants, which thrive under the one, will not thrive nor hardly exist in the other; and possibly it has often happened that plants, introduced into Calcutta, and condemned from their not thriving there, as unsuited to India, might prove most valuable acquisitions in the North-West Provinces or the Punjab. Plants from a lower latitude, such as the Straits, for instance, that do not succeed in Calcutta, it is not unreasonable to suppose would succeed higher up; but many plants from localities such as some parts of China and the Cape of Good Hope, where they are subject to a season of severer cold than they find at Calcutta, there is every encouragement to make trial of in Upper India. Not to mention numerous others, those delightful shrubs, Chimonanthus fragrans and Nandina domestica, that thrive well, but never open a blossom at Calcutta, would, in all probability, the one scent the gardens of the North-West Provinces with the sweet perfume of its flowers, and the other adorn them with its crops of pretty red berries. And now that railway communication has advanced with such rapidity, it is much to be hoped that one of the earliest benefits resulting from it may be the beautifying of the gardens of Upper India with many plants such as these, that have been hitherto unknown there.

The Cold-season in Upper India commences at the beginning of October and cannot be said to be completely over till about the close of April. In December and January, sharp frosts at night are not unfrequent, sufficiently severe to destroy, not only many of the tender kinds of shrubs, but others of hardier growth, unless protected. The European annuals, though often in the early morning rigid with a white coating of hoar-frost upon them, and in an hour or so afterwards exposed to the burning rays of the sun full upon them, seem, with one or two exceptions, to take little harm, otherwise than that their growth is all but entirely arrested while the season is at the coldest. By the 10th February the frosts are generally over.

During March, after their temporary rest, trees and shrubs in a well-irrigated garden push forth with a vigour perfectly astonishing, far beyond anything of the kind ever witnessed in Bengal. The young shoots, however, thus rapidly produced, are very apt to be scorched up and killed in a few hours' time by the fierce hot gales that prevail soon after.

In May, the heat becomes intense, the same at night as during the day. At this period the garden must be unremittingly watered. Many plants in the border left unwatered even for a week would, of a certainty, perish, and most would be sure of dying, if left unwatered during the whole of the dry season. This excessive heat continues with little intermission, unless during the heavy falls of rain that occur more or less in July and August, till September, when it begins gradually to abate.

After the rains, furious winds frequently spring up, uprooting large shrubs and fruit-trees from the soil, while soddened with wet, and soft and loose. There is nothing that happens throughout the whole year so pernicious to the garden as this, and the evil of which it is more difficult to counteract or remedy.

And now, before leaving the subject of climate, a few words may be added with regard to the plants from other quarters of the globe, that are likely to prove suited to India. On this question not much can be decided but by actual trial. We have as yet very little clue to guide us, from what we know of the structure and habit of a plant as it exists elsewhere, in determining whether it would thrive or exist in this country. Of two plants brought from the same spot, the one will thrive vigorously, while the other will pine and perish, without our being able to assign the remotest reason why.

As the general result of our experience hitherto, it may, however, be laid down, that the cultivation of plants from South Australia and the Cape of Good Hope is, with few exceptions, to be regarded as almost hopeless in Lower Bengal. The introduction of the various bulbous plants, with which the Cape so abounds, has uniformly been found unsatisfactory in the extreme. Again, some few of the plants that adorn our gardens come from China and Japan ; but very many beautiful things brought from those countries will not thrive, nor even continue alive here long. The same may be said likewise of plants from Java.

On the other hand, plants from the region of Sierra Leone, the Brazils, the West Indies, and parts of Mexico, are those which have mainly proved suitable to the climate of Calcutta. But, of course, the elevation and the insular position of the countries whence plants are obtained are as much to be taken into consideration as the latitude.

In the Punjab, according to Dr. G. Henderson, all Australian plants thrive well, after they are a year old, and have attained to above three feet in height; but that up to that time they are very sensitive to excess of moisture during the rains.

Since the foregoing lines were written, experience has taught us that, while unprotected many of the fine plants from South Australia, the Cape of Good Hope, Java, China, and Japan will barely exist, they have been found to do very well in what used to be called Betel-Houses, but which have now received the more dignified appellation of Plant-Houses. As an instance in point, the beautiful Tree-Fern, **Dicksonia Antarctica,** may be mentioned. This lovely fern now finds a congenial home in the Plant-House, while but a few years ago it was thought impossible to even keep it alive.

While on the subject of climate, a few words are necessary in regard

to gardening on the hills. It has now become a regular custom with people possessing the means, and having the time, to spend the summer, or part of it, at Hill-stations, while many have made these stations their permanent homes. The climate on the hills is the nearest approach to that of many parts of the United Kingdom, and is almost as changeable. The exception to it is found in the regular monsoons, which usually set in at about the same time as on the plains. This being so, it follows that the treatment recommended for plants in England, may be applied generally, with slight modifications, to the same plants on the hills. Thus, seeds that are recommended to be sown in Spring, should, as a rule, be sown in February and March, and treated just in the same manner as they would be in England; the difference would lie in local surroundings, such as soils, glazed accommodation, &c. But as gardening on the hills is now almost as largely indulged in as on the plains, with much more success in the matter of 'home flowers,' this opportunity has been taken of adding directions for the cultivation of plants on the hills, in the body of the book, wherever such remarks seemed to be necessary, or with special reference to any particular plant or plants.

SOILS.

The gardener must, for the most part, take the soil such as he finds it, and cannot enter into any of those extensive operations for its improvement which, when judiciously conducted, prove so remunerative to the agriculturist. I need, therefore, no more than remark in general, that the soil met with in this country is principally either a clayey alluvium of a dense nature, as in a large part of Upper India, or, as in the Madras Presidency, of a red loose kind of loam, apparently the more fertile of the two.

Where sand is a large ingredient in the soil, as it is in some extensive districts of India, horticulture cannot, without difficulty, be pursued with any very favourable results.

PEAT.—Anything of the nature of peat, such as is employed largely in gardens in England, does not, that I am aware of, constitute the soil of any part of the plains of India. A material called peat has for many years been made use of in the Calcutta Botanical Gardens, and in the Gardens of the Agri-Horticultural Society, principally for potted plants. This is procured from the banks of the river, and seems to be something of the nature of anthracite, perfectly insoluble in water, and affording not a particle of nutriment to vegetation. Pounded course, it seems to serve very much the same purpose that pure sand, or charcoal broken small, would do.

True peat, Sir J. Paxton describes as "the sodden vegetable remains of rushy bogs—inert, antiseptic vegetable matter, that can be brought to little worthy account in the garden." "This," he says, "is not what is meant when gardeners speak of peat; but by the earth, which of late years it has been fashionable to call *peat*, gardeners mean 'the soil of heath-commons.' . . . . . Gardeners' peat ought to be called, what it in truth is, 'heath-mould,' being the earth found at the surface of commons or wastes where heaths grow naturally, and which was formerly called 'bog-earth' as inappropriately as it is now called 'peat.' The best heath-soil contains much fibrous matter; but, upon the whole, not one-tenth part consists of decayed vegetable matter.

"Nothing can be compounded which will answer every purpose of heath-soil. Where, however, it cannot be obtained, it can be most successfully imitated by collecting masses of leaves and small sticks of trees (the fir tribe particularly) which do not grow upon chalk, and exposing them to the weather till they decay to a complete black or brown mould. To the soil thus produced, one-third part by measure of fine white sand may be added at the time of potting."*

TANK-SOIL.—The soil dug from tanks, when cleaned out, is sometimes thrown over the ground as a fertilizer; but it appears to me to differ little from the ordinary soil of the locality, except for the vegetable matter incorporated in it, that has, from time to time, subsided and accumulated at the bottom of the tank. Its beneficial effects, at the best, are said to be but very temporary.

VEGETABLE MANURES.

GREEN MANURE.—Mr. Knight has stated it to be his opinion, deduced from experiments, "that any given (I presume proportionate) quantity of vegetable matter can generally be employed in its recent and organized state with more advantage than when it has been decomposed, and no inconsiderable part of its component parts has been dissipated and lost during the progress of putrefaction and fermentation." When, therefore, at the end of the cold season, the vegetable crops are over, if, instead of removing all leaves of Cabbages, Turnips, Carrots, and such like tender garbage, or, as more commonly happens, of allowing them to lie on the surface to be dried up in the sun, the mâlee were to dig them into the soil, to remain there and fertilize it, till the time of cropping came round again, considerable benefit would result.

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* See Paxton's 'Magazine of Gardening,' Vol. II, p. 191, and Vol. VII, pp. 230 and 249.

LEAF-MOULD.—In most gardens of any size that have been long established there will always be a great quantity of vegetable refuse, particularly at the time when Mangos and other fruit-trees shed their leaves. All this should be collected and thrown into a deep pit, dug for the purpose in some out-of-the-way place. If two or three times during the hot-season water be supplied to the pit, so as to give its contents a thorough soaking, the decay of the vegetable matter will be all the more speedy. In about a year and a half from the time the pit is filled, all that has been thrown into it will have become decomposed, so as to supply invaluable material for gardening purposes, especially for potting. It need hardly be remarked, that it will be found to contain quantities of worms and other vermin which, of course, as far as possible, should be carefully removed before it is used for potting.

On this subject, the following remarks by the Editor of the *Gardeners' Chronicle* will be found of value: "There are only two ways in which leaves, bits of stalk, or rotten wood, twigs, and similar refuse can be safely used:—

"1. One way is to leave them in a heap till they are thoroughly rotted down, then to sift them through a fine sieve, rejecting undecayed fragments, and again rotting down the siftings.

"2. The other is to char them. We do not mean to burn them, but to reduce them by heat and exclusion of air to the state of charcoal dust: a process by no means so easy as may be supposed, but to be carried out by any experienced gardener, after a few failures, which are sure to occur at first. And this is, in our opinion, by far the better method of the two. It is speedy, at once effectual, and destroys the eggs of every sort of insect. The former, on the other hand, is very slow, often the reverse of effectual, and does not possess one single advantage over charring."*

CHARRED TURF.—An excellent material for general potting purposes may be obtained by charring turf. Any quantity of turf may be easily collected, in Bengal at least, from the roadsides or waste places. It should be laid out, exposed to the sun, with the green part undermost. In a few days it will become thoroughly dried, and in that condition may, in a very short time, be roasted sufficiently to be adapted for use. There are various ways in which the roasting may be managed. The plan I have adopted has been to prop a large earthenware vessel upon bricks, light a fire beneath it, and then throw in the turfs, pulled apart into pieces of moderate size; take them out when sufficiently roasted, and throw in others.

VEGETABLE OR WOOD ASHES.—"These," says Dr. Lindley (quoting

* 'Gardeners' Chronicle,' April 12, 1862.

from 'Horticultural Transactions,' Vol. V, p. 52), "are esteemed the very best manure by the Chinese. The weeds which are separated from the land by the harrow, with what they otherwise are able to collect, are carefully burnt, and the ashes spread. The part of the field where this has been done is easily perceived by the most careless observer. Indeed, the vigour of the productions of those parts of their land where the ashes have been applied is evident as long as the crop continues on the ground. The ashes of burnt vegetables are also mixed with a great variety of other matters in forming the compositions which are spread on the fields or applied to individual plants." Garden refuse, however, may in general be turned to better account than by converting it absolutely to ashes.

OIL-CAKE (KHURREE).—This, Dr. Lindley states, "in powder, has a highly energetic, though transitory, action. Its great value consists in giving an impulse to vegetation in the early stages." It is an admirable manure for Roses; and also an excellent ingredient in a compost for applying to the roots of Vines and Peaches in the Cold-season.

GOOR—Of the use of sugar as a manure it is not likely that any notice will be found in English works upon gardening; but in this country the coarse and cheap preparation of it, sold in the bazârs under the name of 'goor,' is found a useful ingredient in composts for manuring fruit-trees.

SEETEE.—The refuse from Indigo factories is found, where available, a valuable manure, especially for vegetables.

ANIMAL MANURES.

BULLOCKS' DUNG.—Of all manures available to the Indian gardener there is none so valuable and universally useful as this; whether applied fresh as a surface dressing, or worked in the soil when about two years old, after it has become thoroughly decayed and reduced to a consistency similar to that of moist black snuff. For the successful cultivation of culinary vegetables it is indeed all but indispensable. But from its being so much employed by the natives as a fuel, it is not always easily obtainable. Even those who themselves keep cows or bullocks find some difficulty on that account in preserving it. When permission can be obtained, it may sometimes be procured from the enclosures where the commissariat cattle are stalled. Occasionally also it may be purchased of the goâlas at a moderate price.

STABLE-MANURE.—This, which in India bears the appearance of dry rubbish, very different from the valuable manure so much in request in Europe, is still of great service for the kitchen-garden. The best way of using it is, perhaps, to cast it upon the ground when the Cold-season

crops are over, and work it in the soil during the hot and rainy months. It may be worked also in the same way in the borders, the soil of which is rarely so good as not to be immensely benefited thereby. It is surprising, however, what prodigious quantities of this material are lost to all serviceable purposes in India. In Calcutta and the suburbs it is not unusual to see a pile of it laid outside the gate of each compound, every two or three days, for the conservancy carts to carry away, and throw into some hole that requires to be filled up, or even to cast into the river. In the North-West Provinces also it is made away with by the syces during the cold months, who, as soon as evening sets in, light their fires and continue burning it a great part of the night. The dense, suffocating, ammoniacal smell it thereby imparts to a cantonment at that season of the year must be familiar to most who have resided in that part of India.

GOATS' DUNG.—This I have often used for a manure; but not, as it seemed to me, with any marked advantage. It remains a long time hard and undissolved without imparting any fertilizing property to the soil. Sheep's Dung, from its similarity to Goats' Dung, would be attended with like results.

PIGEONS' DUNG.—"This," says Dr. Lindley, "approaches nearly to Guano in its effects. In Persia, dove-cotes are kept in the midst of the plains for the purpose of securing this valuable dejection. The Persians use it, as the Peruvians use Guano, by mixing a small quantity in the soil in which their melons and other crops are planted. Wherever it has been tried in this country it has been found of the greatest energy. The only danger in using it is, that it may be too strong, and burn. It deteriorates by keeping."

FOWLS' GUNG.—This, it is stated in the 'Cottage Gardener's Dictionary,' "if composed partly of that of the duck, which is a gross feeder, is nearly equal to Guano."

ELEPHANTS' DUNG.—I have heard this highly commended as a dressing for Artichoke plants. I have applied it, but without discovering it to possess any property of a manure at all. It resembles large dense balls of cocoanut fibre, and, therefore, broken up and worked into the soil it proves beneficial mechanically, in the way of rendering it lighter.

NIGHT-SOIL AND PIGS' DUNG.—It is undoubted that these substances prove most useful as manures for the garden; but the customs of the natives do not admit of their general application. Dr. E. Bonavia, of Lucknow, states that "several years' experience in gardening in this country has taught him that there is no manure equal to night-soil. It produces richness of colour in flowers, and vigour and succulence in vegetables."

BLOOD.—One Cold-season I applied a large quantity of blood and

offal—procured from the butchers' shambles—to the roots of my Grape-vines at Ferozepore. I discovered no advantage whatever in the use of such a manure over that of decayed Cow Dung, while the unforeseen nuisances attending it determined me never to employ it again.

GUANO—says Dr. Lindley, "the deposit of sea-birds on dry islands in the Pacific, is the richest of all natural manures. . . . But it is enormously adulterated. There is perhaps no garden crop which this does not suit, if not applied too much at a time. The liquid form is preferred by gardeners."

I saw it once used very largely for Roses and Peach-trees in the garden of the Agri-Horticultural Society, but with very pernicious effects, as several of the trees died in consequence. The fault, however, was not in the Guano, but in the injudicious manner in which it was applied. The roots of the trees were laid open and exposed some little time, as is usual in the Cold-season, and then covered up again with earth mixed with a large proportion of Guano in a state of dry powder.

Mr. Rivers says: "One pound of Guano to twenty gallons of water forms the very best species of liquid-manure for pot-culture; for the borders double that quantity will be better."*

In the 'Cottage Gardeners' Dictionary' it is stated:—"Plants of various sorts, in pots, watered only with Guano-water, half an ounce to a gallon, have flourished astonishingly; none have failed. . . . . Mr. Rendle and other persons record, as the result of dearly-purchased experience, that where Guano has failed to be beneficial, or has been injurious, it has been applied in quantities too powerful for the plants to bear. In a liquid state, *half an ounce per gallon*, and given to growing plants once a week, it never fails to be productive of vigour. When sown as a top-dressing it should be mixed with five times its weight of dry earth, ashes, &c., and then scattered as thinly as possible."

Baron Liebig recommends as a most effective method of applying Guano to "moisten it with water to which a little sulphuric acid has been added, and mix it after twenty-four hours with saw-dust, turf-dust, or mould, and strew this mixture over the surface of the earth." †

And lastly, Mr. Solly gives this important caution:—"In using Guano as liquid manure, it must be remembered that the solution formed by pouring water over it only contains the ammonia and about one quarter of the phosphates, the rest of the phosphates and the

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* 'Rose Amateurs' Guide,' p. 171, 6th Ed.

† 'Natural Laws of Husbandry,' p. 260.

organic matter being almost insoluble in water; hence the residue is nearly as valuable a manure as that which is dissolved; and in order to derive the whole benefit from the manure, the insoluble part must, by agitation or other means, be kept suspended in the liquid, whilst it is being spread over the ground." *

FISH.—Whenever it can be obtained, fish-refuse is an excellent and most efficacious manure for applying to the roots of trees.

BONES.—In Europe, bones are accounted a valuable and permanent manure, but slow in their operation. Even when reduced to dust they are not so effective the year they are applied as on the following one. Some cultivators, however, have used them for Cauliflowers in this country, and, as they say, with marked benefit.

MINERAL MANURES.

COMMON SALT.—This is strongly recommended as a manure for several of the culinary vegetables, especially for Asparagus. One of our best gardeners in the neighbourhood of Calcutta told me he had applied it plentifully to his Asparagus, but without any particular advantage as far as he could see.

SUPERPHOSPHATE OF LIME.—This mineral, which is manufactured by decomposing bones with sulphuric acid (oil of vitriol), is sold in England at about the same price as guano. Mr. Solly says: "It is one of the most valuable of the artificial manures yet produced." † Whether the application of it in horticulture has ever been experimented upon in this country, or to what extent it would be likely to prove beneficial, I am unable to say.

OLD MORTAR.—This has come to be recognised as a very valuable aid in the cultivation of Ferns, rock-work plants, and, in fact, for a very large number of potted plants. I have seen it used with great success in the Royal Botanical Garden, Seebpore, for all kinds of plants, even for terrestrial orchids. I have tried it myself on a very large scale, and have found such plants as **Begonias, Cyrtodeiras, Peperomas, Fittonias, Anthuriums, Dracænas, Alocasias, Gesnerias, Selaginellas, Ferns,** and a host of others, thrive to perfection in soil three parts of which was composed of this old mortar, or concrete. For rockeries I know of nothing better. It can, moreover, be easily procured. The roofs of old *pucca* houses, when knocked down, afford the best material—the older the better. I strongly recommend the extensive use of old mortar or concrete for potted plants generally. When used

* Rural Chemistry, p. 274.

† *Ibid.*, p. 278.

for small plants in small sized pots, it should be broken into pieces, the size of Hazel-nuts or smaller; when for large plants in large pots, in pieces the size of Walnuts; smaller or larger to suit requirements. Coarsely pounded and added to the soil, it keeps it from getting sodden and sour, by effecting good drainage. The tender roots delight in attaching themselves to pieces of this concrete, from which they obtain much nourishment.

LIQUID MANURES.

Liquid manure should be applied to plants only when in a vigorous state of growth. All plants are benefited by it if administered judiciously, that is to say, not in excess. The copious use of it with culinary vegetables, but more particularly with Celery and Asparagus, I have found of wonderful efficacy. The most convenient way, perhaps, of keeping a supply of liquid manure for kitchen-garden use is, somewhere handy, to sink in the ground a large earthen vessel; fill this with water, and throw in all such ingredients as happen to be available for the purpose, such as fowls', pigeons', goats', bullocks' dung, &c. If found to be too strong, it is easily reduced by adding water at discretion. Dr. Lindley's maxim, in the application of liquid manure, is that it should be "weak, clear, and often." This rule should never be departed from.

SOAP-SUDS.—"These," says Dr. Lindley, "have an undoubted value, because of their potash, irrespective of the animal matter they contain. Upon Cabbages, Cauliflowers, and all the Brassicaceous race, they produce an immediate and very advantageous effect."

Large quantities of soap-suds are daily thrown away from nearly all houses, which, with very little trouble, might be made use of most advantageously for the kitchen and flower garden. When not required for any other purpose, they might be poured into the pit containing garden refuse, stored up for vegetable mould, which would be greatly enriched thereby.

For potted plants they are invaluable, and I scarcely know of a better and more effective insecticide. By syringing and washing the leaves of potted plants with soap-suds, I have preserved them from the attacks of blight, mealy-bug, red spider, and other enemies of the gardener. Plants in a sickly condition have often been restored to health by merely washing their leaves with soap-suds. The effect of washing Geranium leaves with suds is simply astonishing. In fact, if you wish to keep your potted plants in luxuriant growth, wash and syringe them with soap-suds once or twice a week, especially those exposed to dust.

COMPOST.

The following, not very different from that recommended elsewhere for the Grape-vine, is from the MSS. notes of General Jenkins :—

"4 maunds of khullee, well pounded	½ maund of quicklime, sifted.
1 maund of ashes, sifted.	8 maunds of cow-dung.

"Well mix in September and October, and bury in the ground, and water well; and in six weeks it will be ready to mix with mould for the roots of plants."

The following compost I have found the best for potted plants generally :—

Leaf mould, well decayed	... 2 parts.
Cow-dung, well decayed	... 2 „
Garden mould	... 2 „
Wood-ashes, sifted	... 1 „
River sand ...	... 1 „
Old mortar, or concrete	... 2 „

NITRATE OF SODA.—This substance is a very valuable manure for all classes of plants, especially vegetables of the Brassicaceous order. I have seen it used with very remarkable results. In England and the United States of America it is recommended to be used in place of stable and farm-yard manure. It is contended that the nitrogen contained in animal manures cannot be utilised by plants unless converted into nitric acid, and for this an alkali is necessary. It follows, therefore, that it takes a long time for the nitrogen of the manure to be converted into nitric acid, and while this process is taking place, the plants do not get the full benefit of the latter; whereas in nitrate of soda the acid is in more assimilable condition, and is more quickly utilised. It is computed that 3 cwts. of the nitrate are equal to 80 tons of farm-yard and stable manure. As a fertiliser for potted and other ornamental plants, I have found it invaluable. It requires some care in using, and must never be applied too strong. Half an ounce to a gallon of water is a safe application for potted plants, and one ounce to a gallon of water for field and garden crops. In the case of the former, it should only be used when they are about to begin their growth, and when in full vigour. Once or twice a week will be sufficient.

NITRATE OF POTASH, OR SALTPETRE.—This is about the most powerful fertiliser known to agricultural science; but its constant use has the effect of exhausting soils of their other natural elements of plant-food. For Peas, Beans, and other vegetables containing a large proportion of nitrogenous compounds, it is invaluable. I have raised splendid crops of Peas with it. It should be used alternately with nitrate of soda; *i. e.*, one year the potash and the next the soda. It should be used in its dry state, and well worked into the soil.

CHAPTER II.

LAYING OUT OF A GARDEN — LAWNS — HEDGES — HOEING AND DIGGING — IRRIGATION — DRAINAGE — CONSERVATORIES — BETEL-HOUSES—DECORATIONS — IMPLEMENTS — SHADES — LABELS — VERMIN — WEEDS.

THE LAYING OUT OF A GARDEN.

SINCE the manner in which a garden should be laid out will depend much upon the locality where it is situated, and since the disposing of the natural advantages of that locality so as to make them most conducive to variety and ornamental effect, must in a great measure be left to the judgment and taste of the owner, all I purpose at present to do is to give merely a few practical directions which I think generally essential to be attended to.

The arrangement of a garden will be very much modified in reference to the source on which it depends for its supply of water. If, as in the North-West Provinces it necessarily must be, the garden is irrigated by artificial means, the water must be obtained either from a well, or from a tank, or a river.

Where the water is supplied from a well, it is important that the place chosen for the well be, whence the water may have the readiest access to all parts of the garden, and where also it may be easiest screened from view by shrubs and trees planted around it. As native servants, moreover, have continually to be going to the well, both for performing their ablutions there, and for drawing water for domestic purposes, if it can be so arranged, there should be a pathway to it made for them exclusively, cut off entirely from the rest of the garden by means of a hedge. This is desirable, not only for the purpose of keeping the garden as much as possible secluded, but also for the safety of its produce.

The footpaths being raised five or six inches, or more, above the level of the borders, the water from the well is conveyed along each side of them by channels, also a little above the level of the border. Where paths intersect, the water is carried underneath the paths by nuls or

earthen pipes. In these water-channels the shrubs and fruit-trees are always planted.

A more suitable material being not often available, the paths and the embankments of the channels are made of common garden soil, well beaten down by wooden rammers. These, after the heavy rains in August and September, become always so much damaged and broken up as to require to be re-made at the commencement of each cold season. And here I have to call attention to a point of very great importance.

I have found it the almost invariable custom to make the pathways just about a quarter of the width that for convenience they ought to be: in consequence of which the fruit-trees, when arrived at but even a moderate size, overgrow the pathways so entirely as to render them impassable. To remedy this the boughs are usually lopped away, but of course, to the very serious injury of the trees. This mistake of making the paths too narrow should be guarded against when the garden is first laid out. The eye is, at that time, very apt to be deceived, and paths made then as broad as required to be afterwards, will seem to most persons perhaps extravagantly and unnecessarily broad. The growth, however, of the trees on each side will in two or three years' time show the paths obviously to be of no greater width than they ought to be.

In a garden large enough to admit of it, it is highly desirable that there should be one wide shady path, where persons in conversation may be able to walk two or three abreast. A pathway of this description might not unreasonably be made of from twelve to even sixteen feet wide. The best situation for it would be by the wall of the garden, where high shrubs or trees are planted to keep the premises from being overlooked. A pathway of such great width would in reality be attended with no loss of space, as it would extend only over ground occupied by the roots of the trees along the wall-side, thus rendered useless for other purposes. The ordinary paths of the garden, by the sides of which low shurbs and fruit-trees are grown, need not, of course, be so wide, and indeed for variety's sake, would be more pleasing for being narrower; though these, at the least, should not be less than eight feet wide.

In most of the gardens I have seen in the North-Western Provinces, the laying out, as it seemed, has been left entirely to the mâlee, who has portioned out the ground with narrow, uniform paths intersecting each other at right angles, after the pattern of a chess-board. It need hardly be observed, that a piece of land so disposed may answer very well the purpose of a plantation, but does not deserve the name of a garden. Any person of but the smallest pretensions to taste can hardly fail of giving a pleasing appearance to a garden by laying out some of the

paths in a curvilinear form, instead of directing them all in a straight line, as well as by contriving that those even which are drawn straight, should intersect in the form of the letter Y, instead of crossing at right angles. Care, however, should be taken that trees or large shurbs be planted in the principal bend of the curved paths, so that the direction given to the paths may seem to have been a matter of necessity, otherwise they will be apt to look fanciful and unmeaning. A garden thus laid out will entail, it is true, a little extra cost in nuls for conveying water under the paths; but this is, comparatively, of small consideration.

In the gardens of Lower Bengal, where irrigation by water-channels is not adopted, fruit-trees are cultivated in a detached piece of ground, and no large trees or shrubs are planted near the edge of the pathway. In such case the width of the paths is of not so much importance. But still, I think, no garden of any size will present a handsome general appearance unless it has, at least, one wide spacious walk throughout its principal extent, from which paths of smaller width are made to strike out and ramify.

In Bengal the paths are usually made with a foundation of broken bricks, over which a layer of khoâ, or bricks broken into pieces of the size of a Walnut, is spread. Over the whole a coating of soorkee or brick-dust is then laid, and well beaten in, till the surface is perfectly level and smooth.

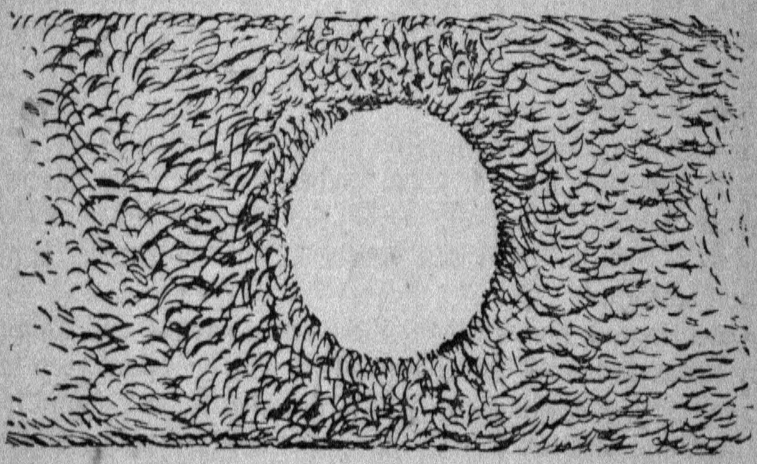
In Calcutta and places where there are gas-works, and where coal is largely consumed, coal ashes or cinders will be found very good for laying over paths. I have used this in Calcutta, and found it better than anything else in keeping the paths from becoming slippery and dangerous to walk upon during the rains. Where procurable, red gravel, known to the natives as *bujree*, should invariably be used.

In planting out flowering shrubs, one thing of essential importance is, that the situation selected for them in the border be where their sunny side is most presented to the sight; for it may be often witnessed that, while the southern side of a plant is loaded with a profusion of blossom, the northern side, shaded from the ripening influence of the sun's rays, remains unadorned with a single flower. This is frequently very conspicuous in the instance of **Millingtonia hortensis**, and more especially of that magnificient creeper, **Bignonia venusta**. If sweet-peas, likewise, are grown on the southern side of a path, the flowers they put forth are completely lost to view.

The modern plan of laying out small separate beds for groups of particular species of annuals is a very beautiful and effective one; and where the garden admits of it, a portion of ground near the dwelling-house may be well devoted to this purpose. The disadvantage attending the plan in Europe is, that during the long period of the winter

months the beds remain bare and unsightly. But in this country such beds need never lie vacant, as when one class of annuals is over, another may be immediately brought to succeed in its place. During the cold months there will be the usual English annuals; during the hot months, **Petunias, Verbenas, Phloxes, Salpiglossis, &c.,** will bloom beautifully; and during the rains these may be succeeded by **Balsams, Zinias, Martynia, Pentapetes, &c.**

In the formation of these small beds it would not be advisable, perhaps, to venture upon any figures besides merely the circular and oval. These are easily designed and always look well; but many of the geometrical and contorted figures one frequently sees are, at the best, anything but pleasing, and when attempted by the rude skill of the mâlee would, in all probability, prove only ridiculous. Examples of beds cut out in grass will be found in Figs. 1 and 2.



The foregoing remarks refer, of course, only to private gardens of limited extent; but even here what is termed the 'natural' style of laying out might be attempted with advantage. Nothing, to my mind, has a better effect than the grouping of plants in clumps according to their growth, colour of the flowers and leaves, and the contour of the ground. This style is beautifully exemplified in the Eden Gardens at Calcutta, and the "Ram Newas" Public Gardens at Jeypore, in Rajputana. I am not an advocate of geometrically-cut beds, and do not recommend them to the average amateur gardener. In large public gardens they may be attempted with success. Winding paths, with clumps of shrubs planted at intervals at the bends and curves have a very fine effect.

In the laying out of gardens of large extent, regard must be had to the surrounding scenery, and advantage should be taken of any 'vistas' that may exist in the neighbourhood, in the way of hills, promontories, church-steeples, clock-towers, &c. In the case of large public gardens, I would consider it a dereliction of duty in the person laying out such a garden if he omitted to take advantage of the surrounding landscape. I am not aware that landscape-gardeners abound in India, but any one having an eye for the beautiful, should have an eye for landscape-gardening. It must be borne in mind that the ultimate beauty and success of a garden will depend very much upon how it is designed and laid out in the first instance.

LAWNS.

When a garden is of sufficient size to allow room for it, nothing is more ornamental than a spacious piece of lawn or grass-plot; and more especially is the surface of cool green that it presents, soothing and refreshing to the eye in the Upper Provinces, when the soil of the country around during the hot months lies all parched and bare.

The grass principally used for lawns in this country is that called Doob-grass (**Cynodon dactylon**), a plant of trailing habit, not growing high, and, when in vigorous growth, of a soft, dark green hue. It thrives where scarcely any other kind will, and delights in the edges of frequented highways. The spot it seems to like especially is where brick and lime rubbish has been thrown and trodden down hard. It will also grow in the poor soil beneath the shade of trees, where other grasses grow but scantily, if at all. When required for lawns, a sufficient quantity may easily be collected from the road-side and waste places. The piece of ground intended for a lawn should be well dug, and trenched, if practicable, and then made perfectly level and smooth. Drills should then be drawn over it a foot apart, in which little pieces of

the roots should be planted out at the distance of half a foot from each other; and the ground afterwards watered occasionally, till the grass has become thoroughly established. In Bengal, further watering will be unnecessary; but in the Upper Provinces irrigation during the hot season is indispensable, as otherwise the grass would soon become scorched up and perish.

A more expeditious and very successful plan of laying down a lawn, sometimes adopted, is to pull up a quantity of grass by the roots, chop it tolerably fine, mix it well in a compost of mud of about the consistency of mortar, and spread this out thinly over the piece of ground where the lawn is required. In a few days the grass will spring up with great regularity over the plot.

Another method, adopted by the editor of the present edition with great success in the Jeypore Gardens, was to first select and level the ground intended for a lawn, and water it well. Then dig up the *doob* grass in squares of about eight or nine inches from localities where it is found growing, with the earth adhering to the roots, and lay it down in the manner bricks are used for paving. Having done this, have wooden mallets, and beat the squares with them, until a uniform level surface is obtained. Very little after care is necessary with this method, and lawns as level as billiard tables may be made. The lawns in the Jeypore Gardens were the admiration of all who saw them, and they were made by this method.

Swampy ground and spots where water lies long after rain are unadapted for Doob-grass. In such localities it soon perishes, and grasses of ranker growth, such as *Mootho* (**Cyperus hexastachyus**), *Kâsh* (**Saccharum spontaneum**), and *Ooloo* (**Imperata cylindrica**) usually come up and supply its place.

HEDGES.

A hedge is sometimes employed for a boundary to the garden, instead of a wall, for which, however, it is not a very efficient substitute. Without constant attention it soon gets out of order; either looking unsightly from being overgrown with weeds, or rendered unserviceable from becoming filled with gaps.

One of the plants, more commonly grown than any other, perhaps, for a hedge is the **Agave Americana.** This is, in itself, a noble-looking plant, and has a fine effect used as a fence, if in vigorous growth and kept clean of weeds. It is perfectly impenetrable by cattle, and, from the lowness of its growth, in no way impedes free ventilation. **Parkinsonia aculeata** and **Cæsalpinia sepiaria** are shrubs armed with powerful thorns, have small-leaved foliage, and, when kept closely clipped, form neat impenetrable hedges.

When a wall is too low of itself to render the garden secure from depredation, plants of the Nicker-tree (**Guilandina Bonduc**), trained upon it, render it at once an utterly impassable barrier. **Acacia modesta**, a common shrub in the Upper Provinces, called there *Phulâee*, forms also a very neat and pleasing hedge. **Æschynomene Sesban** (*jait*) is very often employed also as a hedge in the Upper Provinces, on account of the rapidity of its growth; but it is very unsuitable for the purpose, as, though rather neat and pretty the first season after it has been raised from seed, it becomes worn out and unsightly a season or two afterwards.

Hedges that are required not so much for a fence as for separating one part of the garden from another, may be made successfully of nearly any kind of shrub of quick, ready growth, and of small delicate foliage. I have even seen **Casuarina muricata**, cut down to the height of six feet, and kept constantly clipped, afford a close, dense hedge of most agreeable, soothing character.

For a low, neat, fresh-looking hedge, perhaps no plant is better adapted than **Lawsonia alba** (*Menhdee*) or **Duranta**. The **Dodonœa dioica** has been much sought for of late as a hedge-plant; but it is no novelty. In the garden of Brigadier F. Young, at Ferozepore, it was employed for that purpose as long ago as 1846. But the excessive hardness of its wood turned the edge of a knife, when the attempt was made to clip it, except when quite young, and left unclipped, it became a nuisance, from the profusion of seeds it shed upon the path. **Inga dulcis** also forms a fine hedge.

HOEING AND DIGGING.

Constant hoeing or, the equivalent to it in this country, the breaking up of the surface soil with the Kodalee, is of the greatest advantage, as it is not only the most speedy and effectual way of getting rid of weeds, but it opens and ærates the earth after it has become caked and hardened in the sun from the frequent watering to which it is subject. Moreover, it contributes vastly to the neatness and appearance of the garden; for, no flowering plants can look well in a border that is as hard and compact as the common road.

For the vegetable garden, however, something far more than hoeing only is essential. The ground must be deeply dug; and that not merely just before the time it is to be used for cropping, but immediately after the cold season crops are over—in March or April. The ground should then be dug, if two spits deep the better, and turned over, and the vegetable refuse, at the same time, be buried in. Immediately before the Rains all stable-litter and other manure at command should be thrown upon the ground, and lightly covered in by digging. The rains

will convey the goodness of it into the soil below. A plentiful crop of weeds and grass will most likely soon spring up. The weeds, after about a month or so's time, should be dug in, and the grass-roots carefully picked out and removed. This will require to be repeated once or twice again before the Cold-season, by which time the ground will be in the very best condition possible for the annual crops.

IRRIGATION.

There is, perhaps, scarcely a situation in India adapted for a garden which does not, during several months of the year at least, require irrigation. In the North-Western Provinces in particular, and in the Punjab, if a regular system of watering be not unremittingly kept up during the hot months, nearly the whole of the plants, shrubs, and fruit-trees will inevitably perish. In Bengal, it is true, gardens may be, and, indeed, commonly are, kept up, as far as shrubs and flowering perennials are concerned, without any artificial watering at all; but the growth of plants there, as it appears to me, is not to be compared for vigour with what it often is in localities where irrigation is of necessity resorted to. For the cultivation of culinary vegetables with any degree of success, irrigation is everywhere all but absolutely indispensable.

In Bengal the rains generally cease about the middle of October, leaving the ground sufficiently supplied with moisture to render watering needless, until, perhaps, the beginning of January; after which the earth becomes dry and hard, just at the period when vegetation, for the most part, is making its most vigorous growth, and craves from the soil a greater amount of moisture than at any other time. More particularly, therefore, to plants that are either flowering or in a growing condition, and whose roots lie at no great depth beneath the surface of the soil, the application of water is then of the utmost benefit. Several shrubs and other plants remain dormant till a much later season, and do not begin to put forth till March, or even April; for them, of course, irrigation is quite unnecessary till their growth commences.

Where irrigation is employed, the method of accomplishing it must much depend upon the facilities which the situation offers, and the nearness the water lies to the surface of the ground. I shall describe the several methods I have seen adopted, and state what I conceive to be the particular merits of each.

I. Where the supply of water is from a well.

1. In the North-Western Provinces the general mode of raising water is by means of a large bag, made of the hide of a bullock or buffalo. The bag, suspended from a pulley over the well by a rope of buffalo-hide, is drawn up by a pair of bullocks. From the brink of

the well, to a distance as far as the rope reaches, a piece of the ground is dug out, wide enough for two bullocks to go along abreast, deeper and deeper, so as to make a declivity for the bullocks to run down as they draw up the bag. One coolie is employed to drive the bullocks and another has to stand at the brink of the well, and empty the bag as it comes to the surface.

Where a well-fed, vigorous pair of bullocks are kept, I believe a more effective and economical method than this cannot be employed.

2. In the Deccan of India a common way of drawing up water is by means of a bag and a pair of bullocks, as in the former case; but in this instance the bag opens into a leathern pipe attached to its bottom. The pipe has a rope fastened to it whereby it is so contrived that the end of the pipe is raised above the level of the bag whilst ascending; but when the bag reaches the pulley, the pipe is lowered down over the brink of the well, and the water flows out through it from the bag.

The advantage of this method is, that one coolie is dispensed with, none being required, as in the former case, for emptying the bag each time it rises to the surface. The disadvantage is, that the bullocks have to walk backwards up the slope to the brink of the well each time the bag is being lowered again into the water; and so much time is lost in this slow upward backing movement, that I, for my part, think the former method the preferable one of the two.

3. In the Punjab the all but universal way of raising water is by what is called the Persian wheel.

In the mouth of the well a large vertical wheel is fixed, over which a looped chain of earthenware pots is suspended, the lower part of the loop reaching down into the water. As this wheel revolves, one length of the chain is continually rising with pots full of water, which, on reaching the summit, discharge themselves into a trough fixed in the upper segment of the wheel, and then turn, and descend empty, to be filled again. A large beam, passing through the axis of this wheel, has its extremity fixed in the axis of another large wooden vertical wheel, from the circumference of which projects a series of horizontal wooden cogs, or teeth. These teeth work in the teeth of a large horizontal wooden wheel. By means of a pole projecting from it, a pair of bullocks turn round the horizontal wheel, and so set the whole apparatus in action.

The Persian wheel has the advantage of requiring no coolie besides the one employed in driving the bullocks; and where the well is of very large dimensions so as to admit of a wheel of great size within it—as it always is when employed for agricultural purposes in the Punjâb—the supply of water brought to the surface in a given time is, perhaps, greater by this than by any other means. To wells, however, of the small size they usually are in gardens, I do not conceive the application of the Persian wheel to be any benefit. Its construc-

tion at the outset is expensive; the earthen pots soon become, many of them, broken; the woodwork is constantly getting out of order and requiring repair; while the quantity of water supplied, though poured forth in a continuous stream, is far less by the hour, as I have ascertained by actual measurement, than would be afforded by the bag in the same time.

II. When the water is to be raised from a river or tank, and lies near the surface of the ground, as is ordinarily the case in Bengal.

1. One common plan is to throw up the water by means of a light wicker shovel-like basket, or scoop, with a string fastened to each of its corners. Two men, each with two of the strings, one in one hand and one in the other, stand opposite each other by the side of the water, lower the scoop into the water, and with a jerk-kind of movement throw up the water it contains into a dam made to receive it. If the dam is on the same level as the ground, the water is conveyed from it to the part of the garden where it is required, split bamboos being often used as a channel for it; but if the dam is lower than the level of the ground, two more men are employed in a similar way to throw up water from this lower dam to an upper one on the same level as the ground.

This is a cheap and rude mode of proceeding, resorted to when only a temporary supply of water is required. It is, however, a very effective one, affording a large quantity in a very short time.

2. A method also frequently adopted, is to drive a stout stake into the edge of the bank of a tank or river. Upon the top of the stake a long bamboo is made to turn seesaw-like, a small part of it with a heavy stone attached moving on the landward side of the stake, and the longer part, from the end of which is suspended upright another bamboo, with a ghurra or earthen pot attached to it, seesawing over the water. A man forces the upright bamboo downward till the pot dips beneath the water and is filled; he then lets the bamboo go, and when, by the weight of the stone the pot is drawn up, he empties it, and then forces it down into the water again.

3. By a contrivance exactly similar in principle, sometimes a wooden trough is employed instead of the earthen pot. One end of the trough is forced down by a man into the water, and, on then being let go, is raised by the weight of a stone that outbalances it, so high that the water is discharged on to the land at the other end.

In some localities the water drawn from wells is so brackish that the soil watered with it can never be brought into a fertile condition, as is the case at Agra and Delhi. In such situations, it is only where gardens lie contiguous to a river, whence water may be derived for the purpose of irrigation, that they can be cultivated with much success.

DRAINAGE.

Drainage consists in the withdrawing of water from the soil when all the benefit needed has been derived from it. No operation is more indispensable to the well-being of a garden than this, though often it is found exceedingly difficult to be effected. In some localities, indeed, in the North-West Provinces, it proves to be all but impracticable; for there, from the country being nearly of a perfect level, there is nowhere whither the waste water may be carried off. In such places, after heavy rains, a large portion of the garden will be flooded, and lie completely under water for a week or more. Few of the plants that have been in this way submerged, and then afterwards exposed to the heat of a scorching sun, but soon perish. Frequently, too, about the same time, violent winds prevail, and fruit-trees and large shrubs, that have had their roots loosened in the swamped soil, are easily blown over, and, in most instances, destroyed: as before observed, this is an evil often quite irremediable. The best that can be done is, having ascertained the portion of ground that lies lowest, to plant out there such things as are of least value and most easily replaced, as well as those that are least likely to suffer from excess of wet.

In Bengal, though the ground is equally level, the same difficulty is not so much experienced, from the numerous ditches and tanks there, into which the waste water may be speedily withdrawn.

CONSERVATORIES AND GLASS-HOUSES.

Glass conservatories, or green-houses, in the Bengal Presidency, until lately have been all but unknown. One, indeed, was erected some time ago by Sir Lawrence Peel in his grounds at Garden Reach; but from mismanagement, or from unfitness of the locality in which it was placed, being under the shade and drip of a large tree, it proved of little use; and one, subsequently, by Captain Tronson against the side of his house in the premises of the Peninsular and Oriental Company at Garden Reach, which presented a delightfully ornamental appearance, being kept scrupulously neat and clean, and filled with a variety of Ferns, Begonias, Achimenes, &c. What are usually called conservatories here are nothing more than mere thatched sheds, with the sides open all round. Such places are serviceable for sheltering the more delicate plants, which otherwise would be destroyed by the sun and the heavy rains; but from want of sufficient light the plants rarely thrive well in them. The cost of glass-houses, however, though not excessive, is more perhaps than many Europeans would care to

incur, from the great uncertainty as to the length of their stay in India, or of their remaining, while there, long in the same locality. But in the gardens of the wealthy native gentlemen in the vicinity of Calcutta, the expense of a green-house would be quite a trifle compared with the great ornament and advantage it would afford. Buildings of glass, moreover, supplied with the means of being heated artificially, during the cold months especially, might in all likelyhood afford the facility of cultivating many plants and fruits, which otherwise it would be hopeless to look for on this side of India. The great difficulty, no doubt, will be found in supplying to the plants a due amount of ventilation; and in Lower India, especially during the rains, unless considerable attention be given to this point, numerous losses will be sure to occur.

In the Government Botanical Gardens a small green-house has been erected, which has been found of great advantage for the cultivation of Ferns, Begonias, &c. And at Lahore Dr. G. Henderson and Mr. L. Berkeley have had similar structures, which have proved of inestimable service to them.

Within the last few years, however, glass-houses have become quite common, especially in the Hill-stations. In Simla stoves and green-houses may be seen at the 'Annandale' public gardens, and some of the private dwelling-houses. They are constructed precisely on the English plan, and are used for the same purposes. They have proved very successful, and almost anything can be grown in them. On the plains they are not of so much use, but they can, nevertheless, be made to serve many purposes. In Calcutta there are many of them now to be seen, not only in the Royal Botanical Gardens, but in private nurseries and dwelling-houses. For the cultivation of **Ferns, Orchids, Begonias,** and such plants as are likely to suffer from cold during the winter months, a glass conservatory is indispensable.

GRASS-CONSERVATORIES, OR BETEL-HOUSES.

Sometime ago the happy idea occurred to Dr. Anderson that structures, somewhat similar to those in which the natives of Bengal have from time immemorial grown the Pân, or Betel plant, might be employed with advantage in the cultivation of plants that in nature exist in a climate nearly alike to that in which the Betel does. The attempt was made and proved a wonderful success. The structure in itself is a simple and inexpensive thing. On a piece of ground, measured out according to the space required, stout bamboos are driven at intervals, so as to stand erect about seven feet high. To these a lattice of split bamboos is attached, much in the way in which inclosures for

fowls are usually made in this country. Over the whole lattice, on the sides as well as the tops, a layer of *Ooloo* grass is bound, just so thin as to allow of an equal proportion of sunlight and shade, producing a kind of subdued light. Stages are then erected, either of brickwork or wood to rest the potted plants upon, with space left for paths around or between them. The adoption of structures such as this has opened out to the Indian gardener quite a new world, enabling him now to cultivate numberless plants which previously it had been all but hopeless to attempt.

The original idea has, during the past few years, undergone great change, and now one may see huge structures of various ornamental designs erected, not of bamboos and trellis work, but having solid masonry walls, iron standards, and covered over with galvanized wire netting of meshes varying in size to suit individual requirements, the whole being bound with *Ooloo* grass as in the original. The interior is now laid out in oranamental style, with walks, rockeries, beds, reservoirs, and fountains, having quite a fairy-like effect. Here almost anything may be grown :—**Ferns, Orchids, Begonias,** rare palms, **Anthuriums, Alocasias, Crotons, Gloxinias, Gesneras,** and, in fact, the host of rare tropical and sub-tropical plants, with ornamental foliage and beautiful flowers, which it was impossible before to keep alive even. Such a field have these grass-conservatories opened out to the lover of plants, that he may satisfy almost every wish in the matter of plant culture.

To lay out a conservatory such as that I have mentioned, one must have some knowledge of the requirements of plants. In my own experience, I have found the arc-shape roof most suitable, as being more convenient than any other, while having an ornamental appearance from the outside. In the Royal Botanical Gardens, Seebpore, there is the finest specimen of a grass conservatory I have yet seen. It is of great extent, and is laid out in the interior with consummate taste and skill, and planted with equal taste. It is, however, not possible for private individuals with ordinary means to possess a structure of such proportions, but it may be taken as a model for guidance in erecting smaller ones.

When about to erect a grass conservatory, select a piece of ground away from the shade of large trees. Its length should, if possible, run north and south. The size will depend upon individual taste, and local circumstances and surroundings. 50 feet by 30 feet is a convenient size.

If it is intended to build an iron structure, T iron should be selected for the superstructure, and angular iron for the supports. Upon the size of the house will depend the sige of the iron to be used. The supports should be sunk at least two feet below the surface of the

ground, in a concrete bed, the ends, thus buried, having been previously painted over with red lead, to preserve them from corrosion. Ten feet apart is sufficient distance between the posts, which should be not less than 7½ feet above the surface of the ground-line. Having erected the supports, build a *pucca* brick wall all round the house, 18 inches high and two feet thick, the outer edge being 'flush' with the iron posts, which will thus have extra support to resist the pressure of high winds. Having done this, the roofing may be proceeded with. I prefer this in the shape of an arc, as near as possible; but a flat or span-roof answers just as well. In any case, a line of iron posts must be erected in the centre along the whole length of the house, at intervals of ten feet apart. The two supports at each end of the house should be at least six feet *within* the house, to allow of doors being made. These should be substantial, of iron, covered over with galvanized wire netting, and provided with good padlocks, to keep out thieves and intruders. The whole should then be covered over with galvanized wire netting, the roof with a two-inch mesh, and the sides with a one-inch mesh. Over this a thin layer of *Ooloo* or other grass should be laid on, so as to admit of an equal division of sunlight and shade.

The interior of the house may be laid out to suit individual tastes; ornamental beds, borders, rockeries, &c., may be introduced with very pretty effect; while a reservoir for water in the centre, with perhaps a fountain, would add to the beauty of the conservatory. As I have before said, almost anything can be grown in one of these grass conservatories, and the stocking of it will depend very much upon individual tastes.

If it is intended to build a structure not quite so elaborate and expensive, wood (teak is the best) and bamboos may be substituted for iron throughout; but I much prefer iron, especially if the person building it is a permanent resident in this country. For 'birds of passage,' a simple wooden structure, or even a bamboo house, will be found good enough for all practical purposes.

An important point to remember in building a conservatory is to select a piece of ground somewhat raised above the surrounding level. This admits of proper drainage being secured during the monsoons. It is a consideration too often lost sight of, and many valuable plants are lost during the heavy rains, by water lodging in the house, which ought to have drained off. In Calcutta especially is this necessary; but except in the Royal Botanical Gardens, Seebpore, nowhere else have I seen this important point observed.

The paths in a conservatory should be laid down with red gravel, (*bujree*), and should not be less than 2½ to 3 feet wide. In Calcutta, and places where coal is largely used, coal ashes might be used with advantage for paths. What is wanted is some material that will not

become slippery and slimy during the monsoons. Bricks used in paving paths become very slimy, and there is always danger of having a nasty fall unless one is over-careful.

Some gardeners train climbing plants over their conservatories, but I object to this, except on the west side in Upper India, and the south side in Lower Bengal. In the former, because the strong hot-winds usually blow from the west during the months of April, May, and June; and in the latter, because there is always a strong southerly wind throughout the summer and rainy months. The roof should on no account have any climbing plants upon it, as they effectually keep out the sun's rays, which are so necessary for the healthy development of the chlorophyl, or green-colouring matter of the leaves, and the colour of flowers. The layer of grass is quite sufficient to subdue the hot rays of the sun. This is a precaution very often neglected, and the result is, plants of stunted growth, having sickly, yellow leaves, and washed-out, colourless flowers.

FERNERY.

If it is desired to have a house exclusively devoted to Ferns,—and they are beautiful and numerous enough to deserve such a distinction,—a structure precisely similar to the conservatory might be erected. The design might be varied, so far as the shape, height, and size are concerned. The masonry wall running all round the house need not be more than 10 or 12 inches wide, and just sufficient to allow of the wire netting being nailed on to it.

Ferns all love moisture, and grow to perfection in an atmosphere at once humid and cool. In their natural state they are always to be found in grottoes, near springs of water, and shaded situations generally; and to grow this lovely genus of plants successfully, these natural conditions must be supplied artificially as near as possible. Therefore, in a house exclusively devoted to Ferns, one, two, or more reservoirs of water are absolutely necessary; and if a fountain can be arranged for, not only will the general effect be very pleasing, but the atmosphere of the house, during the very dry and hot months from April to June, will be maintained in a humid state. But irrespective of these desiderata, a reservoir of water in a plant house is always very convenient for watering the plants.

The interior of the house may be laid out in ornamental beds in the first instance. These may then be raised with rockwork to the height of one, two, or three feet, having spaces for the Ferns to be planted in. The reservoirs of water may be similarly surrounded by rockwork, and made to look very beautiful. The wall running round the house might

also have rockwork sloping down from the top at an angle of one to four, and planted with Ferns of low, straggling growth, and entirely covered with **Selaginellas.** The effect of this is very striking. The material I have found best for rockwork is old concrete or mortar from the roofs of old houses that have been knocked down. This can be had in any size, and not only has it a very fine effect, but furnishes to the Ferns a very important element of food—carbonate of lime. Of course, some soil is necessary, and nothing beyond well-decayed leaf mould mixed with a small proportion of river sand need be used. After the Ferns have taken root, no soil will be necessary, for their roots will attach themselves firmly to the concrete and get all the nourishment they need. If Tree-ferns can be had, they should be planted in the centre, round the reservoir of water. Ferns need very little care to grow them successfully; the great point to be observed is *thorough* drainage, and this cannot be better secured than by planting them on rockeries. They must, however, never be allowed to suffer from dryness at the roots, and for this reason should be watered twice, or even three and four times during the day—especially in the months of April, May, and June. In the winter months once a day will be sufficient, while during the rainy months they will need no artificial watering at all, except when there is a break in the rains, and the sun's rays are so powerful as to evaporate all the moisture from the roots.

Every part of the rockery in the Fern house should be planted over with **Selaginellas** of various kinds. The effect is very fine, while they preserve the roots of the Ferns from becoming dry and exposed. In another part of the book (under Ferns) will be found a list of those Ferns most suitable for rockeries.

ORCHID-HOUSE.

The cultivation of this curious, but lovely, genus of plants has become so popular during the past few years, that it is no longer surrounded with that mystery which characterised it some years ago, at any rate, in this country. In one or two large gardens houses have been built for the exclusive culture of Orchids with great success. These plants, in their natural state, are either found on branches of tall trees, or growing in peaty, fibrous matter. In constructing an Orchid house, the first point to be borne in mind is to provide sufficient moisture. The structure should, in every respect, be similar to the Conservatory; only, in place of the ornamental beds in the interior, a raised masonry platform should occupy the centre of the house, the outer edges of which should be raised about three inches to give it the appearance of a shallow tank or pan, so that it

could be filled with water, thus providing a wide expanse from which moisture would always be evaporating, and keep the temperature of the house damp and cool during the hot months of April, May, and June. In this shallow tank terrestrial Orchids should be placed upon inverted pots previously arranged therein. Over this expanse of water might be hung other Orchids from the roof, such has particularly love moisture. The sides of the house might have raised platforms, either of masonry or wood work, upon which to arrange other species which do not need so much moisture. The advantages of this system of cultivation have been demonstrated to me in a few instances very strikingly, and I recommend strongly an Orchid house built upon this principal for the plains of India. In Hill-stations, such as Simla, Mussoorie, &c., of course, a glazed structure would be necessary, precisely similar to those used in England.

I have, of course, not forgotten that an Orchid house such as that described above, is an expensive one, and could only be indulged in by those having sufficient means at command, or by gardens maintained at the public expense. There is, however, no reason why those with limited means should not have an Orchid house, and for these I would recommend a small house, upon the Grass-conservatory plan, with a reservoir in the centre, say six feet in diameter, and one foot deep. The sides of the house might be provided with wooden staging. A section of such a house will be found in Fig. 3. The great point to be kept in view being to secure an atmosphere at once damp and cool, at a time when the fiery hot winds scorch up everything. I do not propose to enter into the system of cultivating these curious plants here. Detailed instructions will be found in their proper place, under Orchids.

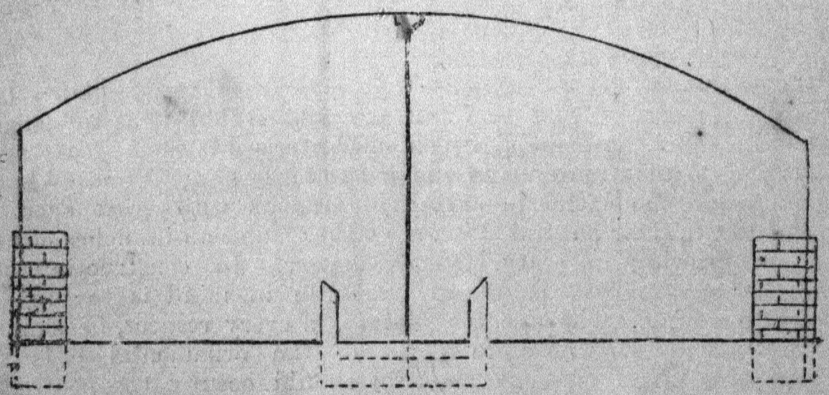


Fig. 3.

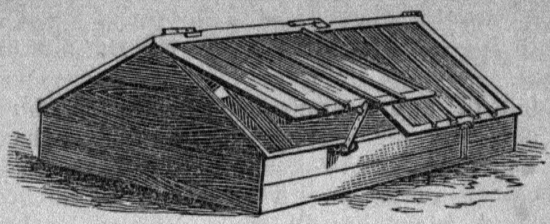


Fig. 4.

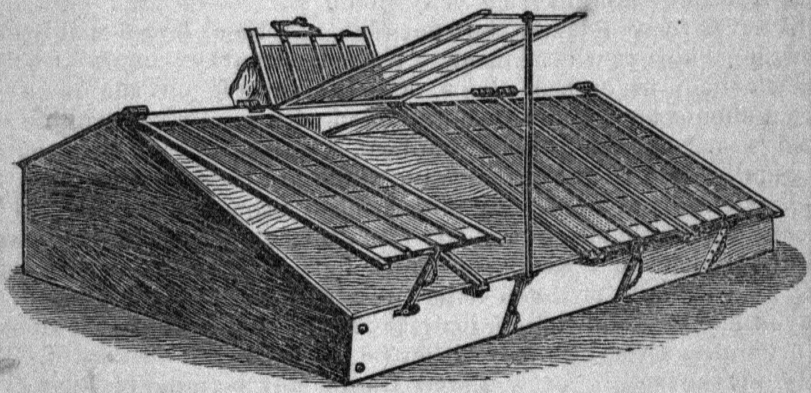


Fig. 5.

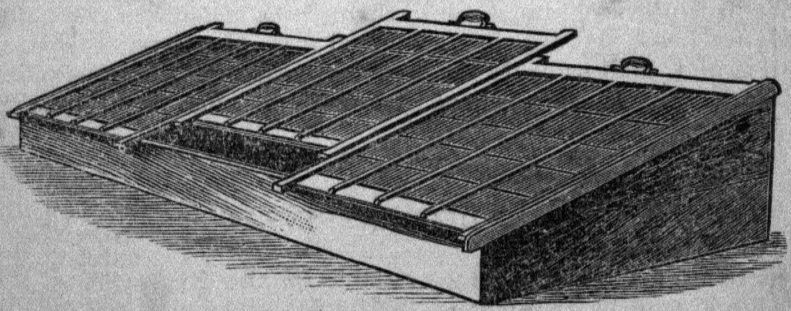


Fig. 6.

FRAMES AND PITS.

Every garden of any pretensions whatsoever should be provided with frames and pits for propagating plants. I have found glazed frames, with cloth awnings to keep out the fierce rays of the sun, the best for propagating plants in. They should be made of common deal wood, and glazed with the common glass to be had of any bazâr glazier. They might either be span-roofed, half-span, or with plain, sloping roofs. I much prefer a span-roof, as then you can get at both sides of it conveniently. They should *always* face north on the plains, and south or east on the hills. There might be a regular range of these frames, made in any convenient size, say 4′ × 2′—6″. They ought never to be fixtures, but portable. In Figs. 4 to 6 will be found a very good idea of what I mean. A shady situation should be selected to place them in on the plains, and the reverse on the hills. The bottom should be well drained, and filled with pure river sand to strike cuttings in. On the hills bottom-heat is necessary, and pots or pans are usually used to put cuttings in, which are then plunged into a hot-bed previously prepared. By pits, I mean propagating pits. Having selected a suitable site in a shady situation, dig a trench or pit of any required dimensions, about one foot deep. Fill this with partially decayed cowdung or horse-litter, mixed with a third part of half decayed leaf mould, bringing it up to about 6 inches above the surface of the ground. These pits may either be shaded by an awning of Tiffany cloth on the south, or a glazed frame may be put over them. For striking cuttings in the winter months on the plains I have found these invaluable. Of course, the cuttings are first placed in pots or pans filled with river sand, and the latter plunged up to the rim in the pit, which provides the bottom heat so necessary in the cold months. On the hills, pits of large size are made, and all potted plants likely to suffer in winter are plunged into them, with a common piece of thatch-work overhead, and are thus protected from the severe cold. Tender plants, and such as could not possibly withstand a temperature below 50° Farh. are, of course, kept in stoves and glass structures of some kind.

DECORATIONS.

There are few opportunities available for the decoration of an Indian garden, except in the means employed for supporting creeping and climbing plants. For this purpose sometimes a single bamboo pole

is inserted in the ground, with two strong pieces of wood on its summit, fastened horizontally, and crossing at right angles. This has an exceedingly pretty effect with a plant like **Bignonia grandiflora** trained up to it, and letting its large clusters of blossoms hang suspended from the crossbars. A similar pole also surmounted with short crossbars, has a pleasing effect when employed for supporting creepers such as **Ipomœa rubro-cœrulea, Quamoclit,** &c.; but in this case strings should be stretched from the crossbars to pegs, fastened in the ground in a circle at some distance from the base of the pole, the creepers being planted just along the outside of this circle, and trained up the strings. Thin or split bamboos would answer better than the strings.

Stout iron rods have of late been introduced for the support of scandent shrubs; these are let into solid masonry, sunk in the earth. Their chief merit is their durability. They are, of course, very expensive, not so pleasing in appearance as supports of wood, and I cannot but think, with the excessive heat they acquire under a fierce sun, must be injurious to the young slender shoots of some kinds of plants, unless painted green or white.

Around scandent shrubs of too large growth for a single pole to support, such as **Combretums** and the yellow **Solfatere Rose,** four bamboo poles are usually sunk in the ground, and united firmly by bars above and below, as well as by bars crossing diagonally.

A very pleasing contrivance for growing creeping plants is, either at some spot where footpaths intersect, or in a corner of the garden where the footpath takes a turn at right angles, to erect at each angle a pillar of masonry, about six feet high and fourteen inches in thickness. To the sides of these pillars attach a trellis of bamboo, and upon their summit erect a sloping roof of trellis. Structures of this kind may unquestionably be made to look very ornamental, overgrown with plants always in blossom, like **Pharbitis Leari,** or **Cryptostegia grandiflora**; but some persons might possibly object to them, from fear of snakes and other vermin being concealed within them.

For creepers grown in pots, trellis-work of bamboo, or frames of iron, may be contrived of various devices. Common examples of this kind of ornament are represented in figures 7, 8, and 9. For some plants, such as **Ferns, Achimenes,** &c., hanging baskets are much used in England, and considered very ornamental. An example of a very fine hanging basket will be found in Fig. 10. In this country, however, the unremitting attention such things demand in the way of watering will perhaps be thought to entail more trouble than they merit. Several of the Orchids, notwithstanding, are grown in this way, and baskets of wood, or copper-wire, or Cocoanut husk, of various elegant devices, are made for containing them, as well as sometimes perforated earthenware vessels.

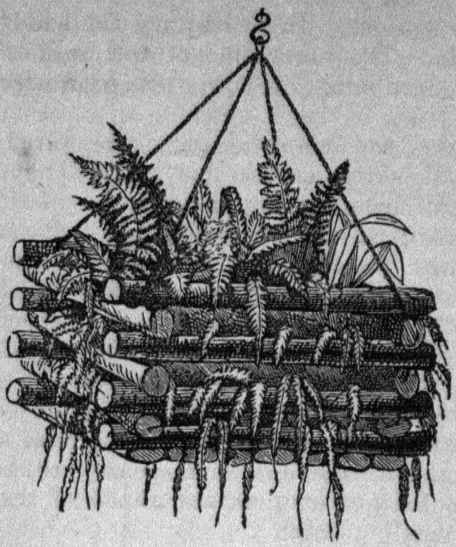


Fig. 10.

Billbergias and their allies, suspended with a small ball of moss tied round their roots, bloom almost immediately, while other and similar specimens have been several years in pots without flowering. **Russellia juncea** is well known to look best when hung up in a pot.

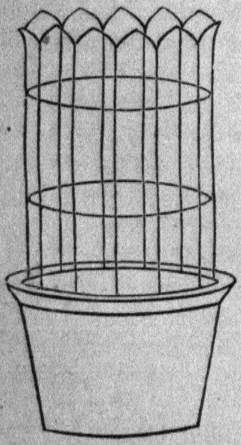


Fig. 7.

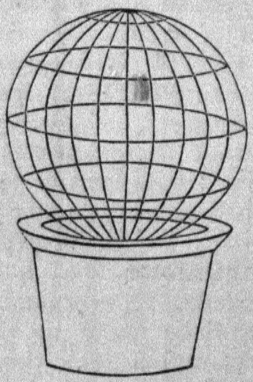


Fig. 8.

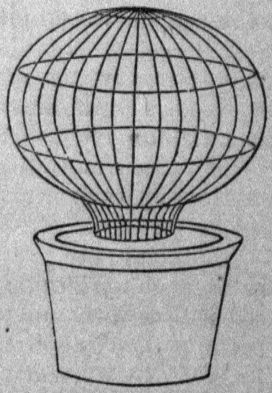


Fig. 9.

For ornamental shrubs and perennials there is nothing, as I think, that looks better than an ordinary flower-pot, kept scrupulously clean. Absolute cleanliness and neatness in a garden are, after all, infinitely

better than all decorations. In a filthy pot the handsomest plant fails of being agreeable. The inner side of the husk of a Cocoanut is a capital thing for scrubbing a flower-pot with when it has become soiled and dirty.

RING-POTS.—These are merely large earthenware cylinders, about a foot and a half in diameter and two feet long. They are let into the earth to about half their length; the remaining half projecting above ground is filled nearly to the rim with soil, and has an ornamental shrub of some kind planted in it. The native gentlemen of Bengal are very fond of growing their choice plants in these, particularly arranged in rows. Several Europeans adopt the practice likewise; but to me they present far from a pleasing appearance.

A far more ornamental way of elevating plants a little above the surrounding level of the ground, if that be the object, and one that may be made far more effective for drainage during the rains, is to lay bricks side by side, with half their length sunk in the earth in the form of a circle, so as to present the appearance of the mouth of a well. Fill this up with earth, and put the plant in the centre. For the same purpose beer-bottles with their necks downwards may also be employed, To my eye the bottles have not a very pleasing appearance; though they certainly look neat, and are much used in Calcutta for edging to borders.

ORNAMENTAL TILES—May be used with good effect for edgings to beds and borders, and along pathways in conservatories. But what appears to me to afford a really effective way of adorning a garden is to build up mounds of rockwork in convenient spots, say a couple of feet high, and place pots of well-grown plants, such as Dwarf Palms, Cycads, &c., on the top, so as to hide the pot in the rockwork.

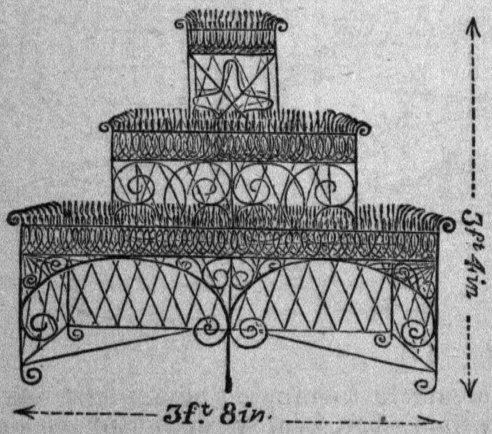


Fig. 11.

FLOWER STANDS—Made of wood as well as iron wire, may also be used with admirable effect. A few designs will be found in Figs. 11 to 14. Any average carpenter and blacksmith can make such stands. They used to be turned out in large numbers, and well made, by the Jeypore School of Arts. In every case they should be painted green.

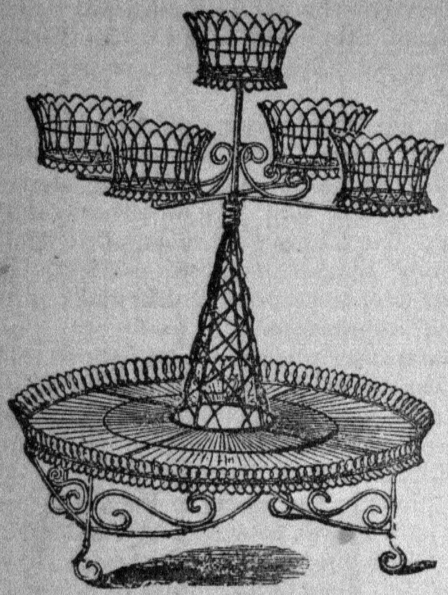


Fig. 12.

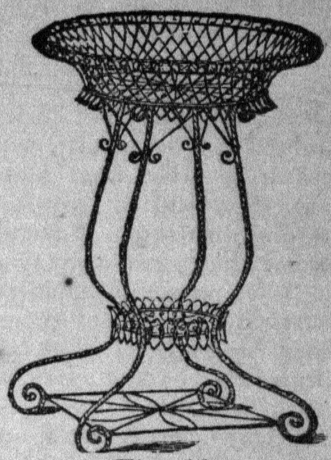


Fig. 13.

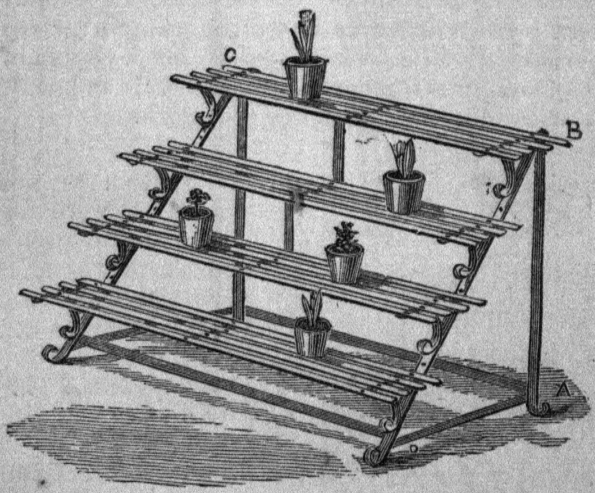


Fig. 14.

VASES AND URNS.—Terra Cotta and Etruscan-ware vases and urns are largely used in some gardens with very fine effect. The objection to them, however, is that plants cannot be grown in them. Flower pots

of convenient sizes with well-grown specimens are put into the vases and urns, and require constant looking after and changing at interwals. A terrace, or the entrances to lawns and conservatories, are suitable localities for placing urns and vases in.

TUBS.—Common wooden tubs, painted green, and raised on rustic stands, might also be used with advantage. Square tubs, with the edges cut into ornamental patterns, look very well with specimen roses grown in them. An illustration of this will be found in Fig. 15. An important point to bear in mind is to have thorough drainage, as without it nothing will grow in tubs satisfactorily. Another important point to remember is, never to put into a tub any plant that has not, or will not have ultimately, sufficient roots to fill it. The evils of over-potting will be as apparent in tubs as in pots, if this precaution is disregarded. Flower stands made of virgin cork are also very ornamental, and have a fine effect. A specimen will be found in Fig. 16.

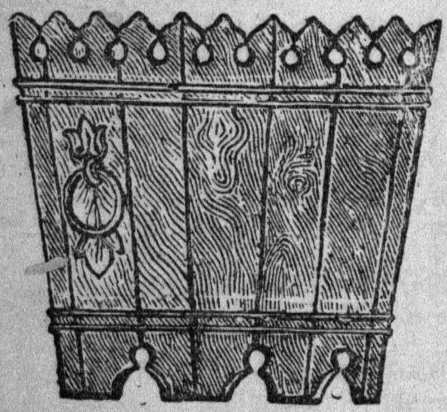


Fig. 15.

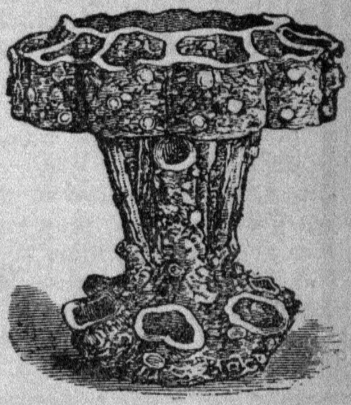


Fig. 16.

ARBOURS, &c.—Ornamental arches made of iron, and covered over with galvanized wire netting, have a very fine appearance, when properly placed, with such plants as **Bignonia Venusta, Bouganvillea Splendens,** and **Glabra Passiflora**, and other large-growing creepers trained over them. Bowers, either rustic or of iron work, may be erected to suit individual tastes. For my part, I prefer the rustic. No garden is complete without garden seats. These can now be had in all kinds, designs, and at moderate cost. Judiciously placed, they give an air of peace and harmony to a garden, and are very welcome on a warm day, when one is inclined to sit under the shade of a tree, and lose one's-self in day-dreams, the enjoyment of the *dolce far nient*, or perchance a favourite author.

IMPLEMENTS AND UTENSILS.

The implements of gardening used by the mâlee need be little more than mentioned, as they are too well known to require a lengthened description.

KODALEE.—The implement that serves for the same purpose as the spade, but having the blade at right angles to the handle, and used in the same way as the pickaxe. It is highly important that this instrument should be examined when new, as well as every now and then afterwards, and if found to be at all blunt, be sent to the blacksmith to be sharpened. With a sharp edge as much work may be done in a couple of hours as would otherwise take a whole day; and far more easily and efficiently.

PHÂORA.—The mattock, similar to the pickaxe, but with the iron ends broad instead of pointed.

KOORPEE.—An implement resembling a very broad-edged chisel, serves in the hands of a mâlee all the purposes of a hoe, as well as for digging round plants previous to removal: principally used in the North-West Provinces.

NERINEE.—An implement somewhat different from the last in the form of the blade, and much more slender, but used in Bengal for the same purposes.

The SPADE and SHOVEL might be found useful on occasions; but, except near Calcutta, they are implements with the use of which the natives are little familiar.

The RAKE.—This, when procurable, is a most desirable implement for keeping the borders neat and clean. The mâlee very soon familiarises himself with the use of it.

TRANSPLANTING-TROWEL.—Where much has to be done in the way of transplanting potted plants, particularly seedlings, a *thin*-bladed, *slightly*-curved blue-steel transplanting-trowel is all but indispensable. After use this should be well wiped and kept scrupulously clean and polished. If allowed to become rusty, in the operation of transplanting the moist earth adheres to it, and considerable injury to the roots of the plant is often the consequence. The thick, strong, iron transplanting-trowels that are sold in England are of no use here for any purpose that I am aware of.

FORK-TROWEL, or TRIDENT.—A small three-pronged implement, let into a handle similar to that of a trowel, very useful indeed for stirring up the soil of potted plants that has become hardened.

A hatchet, a saw, shears, pruning-scissors, pruning-knife, budding-knife, and grass-cutter, are all indispensable, and in constant requisition.

WATERING-POTS.—These, it need hardly be observed, are absolutely indispensable. For watering seedlings that have been lately pricked out, a small can, too, should be provided, similar to that by which lamps are usually fed with oil, holding not more than a pint. This should have no rose.

Various designs have lately been introduced in watering-pots. For watering potted plants a small, blocked-tin can, holding three gallons, with a long, tapering pipe, and having interchangeable, brass roses, should be used. The rose can be made to screw on to the pipe, as in a brass syringe, and precisely of the same kind. One should have *very small* holes for tender plants and seedlings, and the other, slightly larger holes. The roses in common use in most Indian gardens are simply ruinous to the roots of potted plants, as the water rushes out with such force, and in such large quantities, that the tender surface roots are laid bare, and generally injured. The mâlee, moreover, takes a peculiar pleasure, when watering plants, to raise the can aloft, so as to allow the water to fall with as much force as possible.

SYRINGE.—This implement, usually made of brass, is of the very greatest use, nay all but indispensable, to those who possess many Orchids. I know of no contrivance whereby its work may be done anything like so effectually.

GARDEN ENGINES.—These are nothing more than water-barrows on wheels, having a force pump attached in the centre ending with a piece of India-rubber tube half-an-inch diameter, to which is fixed a brass nozzle, having either a spreader or a rose, as may be required. These engines are very useful for washing the leaves of plants in all parts of the garden; as, being portable, they can be carried about by one man. The water is pumped out with considerable force, and thus the leaves get a thorough cleansing. In the conservatory they are invaluable for watering plants over head, or for Orchids suspended from the roof. Tobacco water, or any other insecticide may be applied to every part of the house very effectually by this means. In fact, I regard the garden engine as in every respect quite indispensable in a well-kept garden. They are not very expensive, and may be had of any hardware merchant in Calcutta or other large station.

LAWN-MOWERS.—These are now extensively used all over India, and nothing can equal them for keeping lawns in good condition. There are a great many kinds to be had, and all of them possess some advantage over each other. For simplicity and general use, however, I found the American "Archimedian" the best. A 10-inch mower is a very convenient size for all purposes. I would advise everyone to thoroughly clean and oil the machine after the day's work is done. By this simple precaution a machine will last for years without getting out of order.

SCYTHE.—This is a very desirable implement when the grass-plot is of considerable extent; and I have seen it used very deftly by natives in the Eden Garden.

NETS.—In nearly all parts of India nets, when they can be obtained, are of great service for protecting seed-beds, and trees when in fruit, from the ravages of birds. Sometimes old worn out nets, but quite effectual for the purpose, may be purchased from fishermen at a trifling cost.

BELL-GLASSES are all but indispensable for most kind of cuttings, especially of tender plants. They are now easily procurable in Calcutta of all sizes. But a very good and cheap substitute for them can be easily had, and will be found described elsewhere.

SHADES.

Shades or screens of some description or other are absolutely necessary for protecting young plants from the powerful rays of the sun, on being first put out in the open ground. For want of some such protection, numberless plants that are put out, particularly in the month of February, of a certainty become burnt up and perish. Nothing can be better perhaps for small plants than inverted flower-pots, with a portion of one side cut or broken off. These should be put over the plant during the day, with the open part, of course, towards the north, and removed at sunset.

The stem of a large Plantain slit in two, and cut into portions, affords a supply of half-pipes, which serve admirably for laying over young seedlings to screen them when first planted out.

For larger plants, such as young Mango-grafts, Lichees, &c., some coarse kind of matting or chittâee may be employed bent round and fastened with stakes.

'Tiffany' cloth is largely used for shading now. It is saturated in a chemical compound, which prevents it from rotting. I have used it largely, but don't think much of it, except when used in the winter months for shading seedlings from the direct rays of the sun. It is quite useless in the summer months. There is another rather thick material now offered by some seed-houses at home, which I have found better than 'Tiffany,' especially for shading glazed structures.

TALLIES.

When it is desired to distinguish potted plants by merely numbering them, it will be found far the most convenient to use the tally

of the Horticultural Society of London, of which a representation is here given.

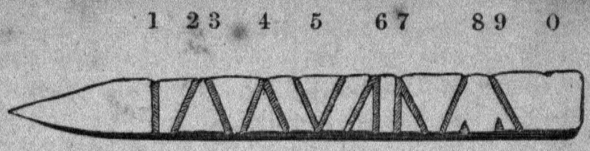


Fig. 17.

This represents a pointed flattened piece of bamboo, upon which the figures cut are always read upward from the pointed end, inserted in the ground. The uppermost of the numerals, when any number is to be cut on the stick, will be in the place of units, the next lower in the place of tens, the next in the place of hundreds, and so on, as in the ordinary Arabic mode of enumeration. Thus IV and VII marked on the bamboo will denote respectively 15 and 511.

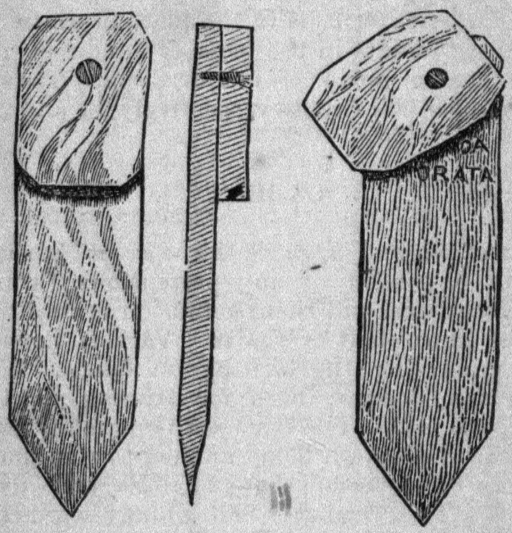
LABELS.

From my point of view I regard the correct labelling of plants very necessary in a garden of any pretensions. Our memories are liable to fail us sometimes, and then confusion is sure to arise regarding the identity of some plant or plants. Various devices have been resorted to for preserving the writing on labels. Some years ago zinc labels of many designs, both for hanging and inserting in the soil first came into use. The ink used is perfectly colourless, but it immediately turns jet black on being applied to the zinc, and remains indelible for two or three years. I found these very useful, and can recommend them. They can be had of any seedsman at home. The ink used is called "Yeate's Indelible Ink for Zinc Labels," and is procurable from the same source.

But for great durability labels made of sheet iron are often used, especially in Botanical Gardens, painted black, with the name of the plant written upon them in white. A simple and speedy way of effecting the same thing is to paint the labels white; and then, when quite dry, paint them over again black, and while the black paint is still wet, write upon it with a broad nibbed reed-pen the name of the plant. The reed-pen, as the writing is proceeded with, removes the wet black paint, and leaves exposed the name of the plant on the white paint below.

Another novel device has been introduced by an American gentleman, Mr. Hild, of Illinois, and was figured in the *American Agriculturist* of March 1887. I have taken the liberty of reproducing this at Fig. 18. The label is a wooden one, and consists in fastening, with a

small screw, a short piece of label over the name, as seen at *a* ; a cross-section is shewn at *b* ; and at *c* the cover is partly removed to show the arrangement. Of course, any size labels may be used. A point of some importance to be kept in view when using wooden labels, is to prevent the lower end, which is in the soil, from decaying. A good plan is to dip the pointed ends in coal-tar, pitch or dammar. An effectual way is to first soak them in a solution of sulphate of iron. When dry, soak them in a strong solution of lime water till the wood is quite saturated. This will form an insoluble sulphate of lime in the woody tissue, and preserve them.



a *b* *c*

Fig. 18.

One of the commonest, easiest, and most serviceable methods of labelling plants, however, is to prepare splints of bamboo or common deal wood, by sharpening one end for sticking in the ground, and flattening the other end, and planing it. On this smear some white paint, and while wet, write upon it with a lead pencil. When the paint dries, the pencil writing will remain fixed in the body of the paint, and last indelible for a long time. To prevent the lower or painted ends from decaying, dip in dammar, or soak in the solution recommended above. These labels can be made for suspending also by having both ends flat, and a small hole bored at one end.

of nearly all kinds of small seed, and will often clear off every grain of it from an extensive sowing within a very short time after it has been made. Lettuce-seed they are especially fond of, which, when sown in the open ground, it is very difficult to save from their depredations. With regard to flower-seeds, when very choice, or when there is but a small supply, the only safe plan is to make the sowing in a seed-gumlah, supported on an empty flower-pot, standing in a pan of water. In flower-pots, moreover, potted with any loose kind of material, such as employed for Orchids, they are very destructive, establishing themselves by hundreds, laying their eggs, and breeding their young. They cannot be allowed to remain with safety to the plant, nor can they be easily removed, without more or less injuring it at the same time. A saucer of sweet oil is an irresistible bait to them, into which they will rush and destroy themselves by numbers.

Upon the means of destroying ants, Captain Weston makes the following remarks: "The usual way of getting rid of the red ant is, I believe, by powdered turmeric or huldee. I, however, found a plan my mâlee had last year more successful. When the seeds were sown, a Cocoa-nut, with the kernel in it, was cut in halves and laid near the seeds; the ants flocked to it, and when it was full of them it was immersed in hot water. The nuts were watched during the day, and in three days no more made their appearance. A few days after they made their appearance again, when they were treated in the same way, and again similarly disposed of. My plan, when I find a nest of red ants in the road, or any part of the compound, is to bund the spot round with clay and pour in boiling water, and I have found it efficient in the destruction of the red ants." *

White-Ants.—This pest has a wide reputation for mischief. It has been asserted by competent authorities that they rarely, if ever, attack living plants or trees; that in every case where they have been discovered attacking the roots, the trees have invariably died first, and that as a rule their attacks are confined to posts and stakes. My own experience has been quite different. Some years ago, I one day planted a circular puzzle with the **Inga dulcis**, and selected the rainy season for the planting operation. The following morning I noticed a number of the plants dried up, and upon pulling them up, found the roots from the stem just below the soil, completely eaten away by white ants which swarmed over the roots. Within a week *every* plant had been destroyed by these voracious pests. I have observed, however, that it is only in dry, sandy soils that these termites attack living plants. I have never had occasion to complain of them in this respect in Lower Bengal. I know no remedy for getting

* 'Journal of the Agri-Hort. Society,' Vol. X., p. 81.

rid of them, except that wherever found, their nests must be destroyed, and every termite killed. Smearing with damar I found a good preventive. Burying green neem leaves at the roots is said to keep them off also.

The Great Cricket.—(Carpenter-Insect)—*Jheengoor*—**Schizodactyla monstrosa.**—Westwood, in his edition of 'Donovan's Insects of India,' says this is a scarce insect in Bengal. Well, indeed, would it be for some of the gardens there if it were so! This most destructive insect is about an inch and-a-half long, and as thick round as a man's little finger, of a chocolate-brown colour. It bores deep circuitous cylindrical passages in the borders, in which it lurks during the day. At the dusk of evening it issues forth and fills the air with its shrill loud whizzing-kind of chirp. During the night it employs itself in nipping off the stems of whatever young plants may be in its neighbourhood, a portion of which it drags down into its retreat. I have in vain endeavoured to dig it out, as it always eluded my search. I found, however, by pouring a large can of water into its hole, it immediately came to the surface, when I was able to seize and destroy it. Before pouring down the water, notice must be taken whether the hole be one that has been vacated or not. The presence of the insect in the hole may be easily known by the orifice being strewn with fresh earth, like the castings of a worm, very frequently with a leaf or two drawn over. When the hole has been deserted, it is left without any such attempt at concealment.

Grubs.—These are for the most part the larvæ of beetles. The ravage they commit is almost entirely confined to the roots of potted plants, in eating away the fibrous parts, and thus ultimately causing the plants to perish. They are generally introduced in the cow-manure, employed when the plants are potted. All that is required to keep clear of them is to examine the manure carefully before using it, picking out whatever grubs are found, and destroying them.

Cockroaches.—I have never, that I am aware of, had any injury done to my garden by these insects; but I have seen it stated that they "often spoil a young shoot or flower-stem of an Orchid in a single night," and that the following is a successful plan for extirpating them: "Get some short twigs, a few inches long, and divested of their bark; put one end into the soil, and cover the other with a composition of spermaceti and arsenic, well mixed. They will last for months.

The Red Beetle.—This most destructive pest is about the size of a lady-bird, but narrower in form. The ravage it commits is almost entirely confined to young plants of Melon, Cucumber, and Squash, eating up the fresh green leaves as soon as they are produced, thus effectually stopping the growth of the plants. It is, however, principally

plants that have been raised from English or American seed that suffer, those from country seed taking little harm from its attacks.

The usual method adopted to preserve the plants is to cover the leaves with wood-ashes. But by this means the leaves, as must be obvious, having their pores stopped up, are unable to perform the functions for which alone they are of any use to the plant, and might almost as well have been left alone to be eaten by the beetles.

An old beer-chest, with the top and bottom knocked out, and a piece of cheap, green mosquito-curtain leno fastened over it, appears to me as simple an expedient and as thoroughly an effectual one as could be employed for covering the plants with, to protect them from this insect. When the plants attain a certain age, the beetle ceases to attack them.

Worms.—These are amongst the greatest nuisances to potted plants that gardeners are troubled with. The better the soil employed, the more eager are they to make their way into it, and consume all its goodness. During the Rains in particular, unless the pots be supported upon a couple of bricks, laid parallel to each other, about four or five inches apart, it is all but impossible to prevent worms from gaining access through the aperture at the bottom.

At potting-time also, the soil should be carefully examined, so that none be introduced then. When, however, after all precautions, it is found that worms have established themselves in the pot, it is said that a little clear lime-water will drive them out. They can be easily removed, Mr. Wood states, by employing the solution of ammonia.

Toads.—These unfortunate reptiles have a bad name, handed down from generation to generation; but that is the extent of their delinquencies, so far as injury to plants is concerned. They are most useful creatures, and their value in the garden has now been recognised in France and America, where they are sold at a good price, and used as destroyers and consumers of insect-pests injurious to plants. I have made it a practice now to let loose as many toads as I can get into the conservatory, which I find is kept wonderfully free from insects. I advise every gardener to do the same.

BIRDS.

Crows.—These, when the fit takes them, are perhaps the most formidable of all enemies to young plants in pots. It is almost certain ruin to leave freshly-potted bulbous-plants exposed in any place where crows frequent; for, even if they do not pull the bulbs out immediately, they will be almost sure to peck them to pieces as soon as they have pushed a little above ground. Paper labels never escape being destroyed by them.

There are only two ways of protecting plants from their attacks. The simplest is to shoot one occasionally, and hang it up for a day or two

in the spot from whence it is desired to scare them. The other method is to protect the plants with a net.

Sparrows.—In the vicinity of Calcutta I have never seen any harm, to take notice of, done by sparrows; but in the North-West Provinces, where they abound in prodigious numbers, there are few kinds of vermin more destructive. For annuals they have an especial fondness, and in a very short time will clear off the young seedlings from almost any number of pots. Of a sowing of Beet, not a particle will escape them as soon as the seedlings rise above ground, and upon a crop of Peas they feed ravenously.

Nets, when they can be obtained, are I believe the only efficient means of sheltering plants from the mischief they do them.

Parrots.—The little green parrot is a most destructive bird to ripening fruit, unless nets be thrown over the tree to keep it off.

ANIMALS.

Flying Foxes.—These commit their depredations on ripening fruit by night. A net is the only safeguard against them.

Rats.—No piece of ground where rats have established themselves can be of any use for cultivation until they have been extirpated. But this I have never found a matter of much difficulty. I have succeeded in immediately getting rid of them by making pellets, about the size of a marble, with flour and water mixed with a little powdered arsenic. These, placed at the entrance of the freshly-made holes in the evening, have disappeared in the morning, and the rats with them.

Captain Weston states that blowing the fumes of sulphur into their holes by means of a common bellows is an effectual method of destroying them.*

Squirrels; Baboons.—These animals are sometimes very destructive to fruit, from which I know of no way of keeping them off, but by driving them away as soon as observed.

Rabbits.—These, where they abound, as I believe they do in the Botanical Gardens, are very destructive, and I hardly know any protection from them but a fence of wire-netting.

Jackels.—These do no very great harm in a garden beyond occasionally scratching up a hole to the injury of any plant that may be in the way. For those, however, who consider them a nuisance they would gladly get rid of, I subjoin the following extract:—

"Our host told us that about two years ago he got some nux vomica and other poisons, mixed them with tallow, and enclosed small lumps of this mixture in pieces of the entrails of sheep, which he dragged about his yard in

* 'Journal of Agri-Hort. Society,' Vol. IX., p. c.

the evening, and then hung upon a bush, afterwards dropping pieces containing poison along the track. The first morning after he had done this, fifteen jackals were found dead about the premises."†

Porcupines.—In those parts of India where these animals abound, they are, I understand, exceedingly injurious to gardens. The usual method adopted for their destruction is to dig pits to entrap them.

Goats.—All kinds of animals, it is needless to observe, should be excluded as much as possible from a garden, but few more scrupulously so than goats, for they are about the most pernicious. They are especially fond of Rose-trees, giving them the preference to all others. There is some peculiarity in their bite, insomuch that a stem, once nipped by them, becomes poisoned, and must be cut completely in, as it will never thrive again afterwards.

THIEVES.

It is well, if possible, to exclude all other servants but the mâlees from the garden, as they are much given to pilfer the best of the fruits and vegetables. But it is principally in Calcutta and its vicinity that the theft of ornamental plants is much to be feared, and there it is of continual occurrence. When a theft of this kind takes place, it may be laid down, I believe, for certain that it is either the act of the mâlee himself, or done with his concurrence. For many of the thefts, however, of valuable plants the actual thieves are not so much to blame as those who purchase of them, as such plants can hardly by any possibility come into a native dealer's hands except by thieving.

WEEDS.

Upon the whole, weeds do not appear to be a greater source of trouble in an Indian than they are in a European garden. There is no other way of keeping the ground free from them, but by either pulling them up by the roots or cutting them down with the koorpee. This, of course, is most effectual when done in the hot weather, as when cut down at that time, they have little chance of recovering themselves. But it should be done most perseveringly; for the beauty of a garden depends quite as much upon the scrupulous cleanliness with which it is kept, as on the choiceness of the plants it contains.

The most troublesome weed we have is perhaps the *Mootho* Grass. The roots of this produce crops of little kernels, any of which, left in the ground, retain their vitality and grow after a very long time. By diligently searching for and digging out these kernels, the weed may soon be entirely eradicated.

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† Ellis's 'Madagascar,' p. 222.

CHAPTER III.

SEEDS—SEED-SOWING—POT-CULTURE—PLANTING AND TRANSPLANTING—CUTTINGS—LAYERS—GOOTEE—GRAFTING AND INARCHING—BUDDING—PRUNING AND ROOT-PRUNING—CONVEYANCE.

SEEDS.

THOUGH many of the ornamental plants of our Indian gardens can only be propagated by cuttings or layers, there are at the same time several which may be as well, or better, raised from seed. Flowering annuals and culinary vegetables it is, of course, impossible to obtain in any other way.

In a paper sent by Dr. E. Bonavia to the 'Journal of the Agri-Horticultural Society,' Vol. XIV., p. 190, there are some remarks upon the acclimatization of seeds, which it may be found interesting to refer to. Dr. Bonavia there asserts: "If a plant germinates, grows well, and seeds, there is no sensible reason why it should not be improved in this country as well as anywhere else, provided the conditions of healthy and luxuriant growth are invariably given. For any one to talk of degeneration of seeds in this country by acclimatization is simple nonsense." That much country-saved seed, however, does become degenerate, even when the conditions above mentioned are secured, my own experience has proved to a certainty. This may be often, though not in all cases, owing to the want of protection from the scorching effect of the sun upon it while yet immature, and when the plant that bears it becomes so parched that it can afford it no sustenance. This I have clearly ascertained and provided against, in the case of the Lupin, as noticed further on; and it is only reasonable to conclude that the same may hold good as regards other plants of a temperate climate that decay soon after they have blossomed on the approach of the Hot-season. But addmitting this, it remains to be explained, why even in England where all the above conditions are realised to perfection, it is still found necessary to import annually, at a high price, from Germany the seeds of such plants as China Asters, Stocks, Balsams, &c., as alone to be depended upon to produce the finest flowers. He furthermore

adds, "people complain that flowers originally double, by acclimatization eventually become single. I have no hesitation in saying at once that when this occurs, the fault is neither in the seed nor in the climate, but in the gardener. There is little doubt that doubleness depends on luxuriance, and the tendency of a plant is to transmit that quality to its descendants, so that if the climate admit of the growth of the plant at all, luxuriance and doubleness are in the hands of the grower." This I cannot let pass without at the same time noticing what is asserted by Dr. Lindley, that doubleness "can scarcely be from excessive vigour, for no one has ever yet obtained a double flower by promoting the health or energy of a species."* I am, however, inclined to doubt the strict accuracy of Dr. Lindley's argument, at any rate, so far as Indian conditions are concerned. I have found, as a matter of fact, that doubleness in flowers depends very much upon nourishment. Frequently I have given seeds of Asters, Stocks, &c., to friends, and have sown the seeds from the same packet myself at the same time. The results have, however, been very different. While my plants produced splendid double flowers, the others had worthless, insignificant flowers, scarcely semi-double. I have noticed the same features in the case of many other double-flowering plants. As examples, I might name the Rose, Dahlia, Zinia, Balsam, and a host of others.

For successful gardening, no point is of more importance than that the seed procured for sowing should be both sound and of the finest kind. The excellence of seed is not to be tested simply by its germinating speedily and abundantly, but rather by the quality of the produce that it yields. Much of his seed the Indian gardener may save far better from his own garden than he can procure it elsewhere. Within the last eight or ten years, it has been found that acclimatized seeds give much better results than imported seeds; this, of course, when proper care has been bestowed upon the operation of cultivating for seeds alone. In the reports annually submitted on the working of the several botanical and other Government gardens in this country, the importance of saving seed is being recognized every year; while the demand for acclimatized seeds is increasing. My own experience is that seeds saved in this country give very good results; indeed, I should not care for better. Only in the case of novelties should the gardener look to Europe for seeds. The saving of seeds, it is true, involves some little trouble; but it is well worth it. I, therefore, here submit a few suggestions I consider essential to be attended to for the purpose.

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* 'Theory and Practice of Horticulture,' p. 501.

1. *Small Trees and Flowering Shrubs.*—The seeds of many of these may be saved at once by merely gathering them when ripe upon the the plants, drying them, and storing them away. The seeds of some, however, are exceedingly small and fine, and those of others likewise immediately drop off on becoming ripe: so that unless precaution be taken beforehand, they are all sure to be lost. A simple and effectual plan of securing them is to tie a piece of fine muslin round the stem of the seed-pods before they are ripe, so as to enclose them in a little bag, from which when ripe they may be removed at leisure.

2. *Annuals.*—Perhaps it may be thought needless trouble to gather the seeds of these, as they may be so easily procured fresh and good from England, and particularly as some degenerate if sown repeatedly from seed the produce of this country. There are, notwithstanding, many which do not degenerate from being raised each season successively from garden-seed, but which, in Bengal especially, cannot be cultivated successfully otherwise. I may instance the Sweet-pea, which in the neighbourhood of Calcutta, when raised from English seed, though it thrives vigorously, seldom puts forth a single blossom; and several annuals besides, the imported seed of which does not germinate, perhaps, more than once in two or three seasons that it is sown. During a residence of several years near Calcutta, the English Larkspur seed that I sowed each year I never found in a single instance to germinate. A good way of securing the seeds of most of the annuals is to pull the plants up by the roots just before the seeds are quite ripe, and lay them upon the sheet of a newspaper in a dry room, where the seeds will ripen even better than they would have done in the garden; and none that drop off will be lost.

3. *Culinary Vegetables.*—Where the seed of culinary vegetables is easily obtainable from Europe or America, it will not, I believe, be found advantageous to save any from the garden, except it be of Peas, Beans, Onions, Mustard and Cress, and in Lower Bengal Artichokes and Cauliflowers, which in that locality, when raised from imported seed, are rarely productive; as the produce of what is termed acclimated seed is unquestionably very inferior to that of imported. Onion-seed seems to retain its vitality a much shorter time than any other vegetable seed; hence imported seed sometimes germinates very scantily, and frequently not at all. In the Upper Provinces, likewise, whither the conveyance of heavy seeds, like those of Peas and Beans, involves a considerable expense, an abundant supply of the seed of these vegetables may be saved from the garden each year in succession, without the produce raised from it being found much, if at all, degenerate. Care, however, must be taken that the finest seed be saved, and not that merely which is left, after the best has been gathered for table use. When a person is dependent entirely upon his own garden for

his pea-seeds, he should make sowings, the produce of which is to be reserved exclusively for seed.

THE STORING OF SEED.

One point of great importance is, that, before gathered, the seed be fully developed and perfectly mature. When this is attended to, the preservation of its vitality, under the most trying circumstances, is quite astonishing. An instance whereof may be seen in the length of time that it will remain unharmed even in sea-water, as stated by Mr. Darwin: "Until I tried, with Mr. Berkeley's aid, a few experiments, it was not even known how far seeds could resist the injurious effects of sea-water. To my surprise I found that out of eighty-seven kinds sixty-four germinated after an immersion of twenty-eight days; and a few survived immersion of a hundred and thirty-seven days."* Of the intense degree of heat they have the power of withstanding I once, too, had a notable proof. A small tin-box of seeds of annuals was sent me from England. On opening it, I found that the heat of the soldering-iron had scorched to a dark-brown colour several of the paper packets in which the seeds were put; whence I concluded that the seeds must of necessity have been destroyed: on trial, however, I found them not in the least injured, as they germinated freely. An instance, again, of their capability of remaining long without taking harm, alternately in a dry and wet condition, may be witnessed in what takes place every year in most gardens in this country. The seeds of several of the European annuals, such as Larkspur, Mignonette, Phlox, Petunia, Sweet-pea, &c., will fall when ripe, and lie for some two or three months exposed to the influence of a baking sun, and then for the three or four months of the rains which follow remain embedded in the swampy soil; and yet afterwards, on the arrival of the Cold season, germinate and spring up vigorously.

There is one thing, however, which it should be well borne in mind seeds cannot endure, and that is sour damp. There is no way of destroying them more certain than to place them in a situation where they are exposed to a constantly humid, unventilated atmosphere. In Bengal, few seeds of any kind gathered during the hot season, and put away merely in a box, or in a drawer, or on a shelf in the house, but during the rains are sure to become musty, and perish before the time for sowing them, in October. To preserve them it is absolutely necessary, having first thoroughly dried them, to store them in well-cleansed bottles, which should then be well corked and hermetically sealed with wax. Not only is this a mode of preserving them against the baneful effects of damp, but an effectual protection likewise from the ravages

* 'Origin of Species,' p. 358.

of acari and weevils, by which, in all parts of India, they are very liable to be destroyed.

SEEDS FROM THE GOVERNMENT GARDENS IN INDIA.

Calcutta Botanical Garden.—Seeds of trees, shrubs, and flowering plants were formerly distributed gratuitously from this garden to all who applied for them; but of late years the distribution has been entirely discontinued;—a circumstance of little importance had there been any means of obtaining similar seeds elsewhere; which unfortunately was not the case some years ago; but within the last few years several Indian firms have taken to importing English and American seeds, which may be had at moderate prices.

Saharunpore Botanical Garden.—Seeds are not now, I believe, distributed gratuitously to applicants from this garden. To residents in the North-Western Provinces the gift of seeds of flowering annuals and culinary vegetables used to be a great boon; but the seeds of ornamental shrubs used in most cases to be very indifferent both as to kind and quality. But this has now improved very much.

Ootacamund, Neilgherries.—Seeds of culinary vegetables are raised at the Government Gardens on the Neilgherries, and offered for sale to any who wish to purchase them. Some years ago a trial of these was made on a large scale by the Agri-Horticultural Society; but they were found to give so little satisfaction, that it was not considered desirable to procure any more from that source. At this I am in no degree surprised; as during a stay of some months at Ootacamund, the vegetables I tasted there, raised from seeds of the place, were in every instance very indifferent, vastly inferior to such as are raised during the cold season in the gardens about Calcutta. I was informed, moreover, by a gentleman who had been a resident of Ootacamund a great many years, and who bore the reputation of being the best amateur gardener there, that the produce of vegetable-seeds saved in his own garden were so inferior that he never thought it worth while to sow them, but sent annually for a fresh consignment to England.

PACKING OF IMPORTED SEEDS.

"As all seeds," says Dr. Jameson, "in this country rapidly degenerate, it is absolutely necessary that a continual supply be received from Europe or America, to enable us to distribute good seeds."* It will be seen elsewhere that I am far from concurring in the statement that all European seeds degenerate, or that some which do, with due precaution, need do so. But there are many notwithstanding which, to

* 'Report upon the Saharunpore Botanical Garden.'

save trouble, and on the score of economy, it is no doubt far better to import; not to mention that there are some plants likewise which, in Bengal at least, never yield seed at all.

For many years past the means of conveying most securely seeds to this country have engaged the attention of Indian horticulturists It may, therefore, be presumed that the best plan for the purpose has by this time been pretty clearly ascertained: and I think it may now be stated for certain that where large quantities of seed are to be conveyed, no plan can be better than to send them packed in tin cases, hermetically soldered down. This is the plan that has been uniformly adopted by the Agri-Horticultural Society with perfect success in the immense consignments they receive annually from England and America. It is the plan, too, that I myself have found invariably successful in the numerous importations that I have from time to time made to this country.

Formerly, when much of the seed sent to India proved worthless, a strong prejudice, for some reason or other, existed against this mode of conveyance. A gentleman, for instance, writing from Goruckpore, says: "Having for the last three years obtained various flower and other seeds from England per overland mail, I may say, that, if put up in tin boxes soldered down, the chances are that not one will reach this country alive. There is no reasonable hope for their doing so. In no case have I succeeded in obtaining a single plant from those packed in tin."* But it has now been made quite plain, I think, that in all instances where seeds thus conveyed have proved unsatisfactory, the failure has been due to some other cause, rather than to the circumstance of their having been packed in tin. Mr. R. Fortune states that some years ago, in his voyage to China, he took with him a quantity of seeds of various kinds: a portion were put in tin and soldered down, and a portion in canvas bags, packed loosely, and suspended in his cabin. Each plan, he says, proved equally successful; and all the seeds nearly turned out good.†

One precaution, however, I think it possibly of some importance to attend to, and that is, that no other article be put within the tin case with the seeds. I mention this, as I have known it occur that a person has been even so indiscreet as to pack seeds and bulbs in the same case. The effect upon the whole contents of the case, of one of the bulbs becoming unsound, may be easily imagined.

Again, seeds imported for gardens in a damp climate, like that of Bengal especially, should be soldered down in separate tin cases, according to the time they are to be sown; for if, as is usual, all are packed

* 'Journal of the Agri-Hort. Society,' Vol. III., p. 69.
† 'Journal of the Agri-Hort. Society,' Vol. VI., p. 154.

in one case, the case must be opened either much too soon for the sowing of some kinds of seeds, or too late for that of others. For instance, Asparagus, Cabbage, Cauliflower, Celery, and Knol-kohl seeds should be sown as early as the first of September, or earlier; but if all the seeds be contained in one case, and it be opened at that time, there is every reason to fear that the seeds of Onions, Radishes, Turnips, Carrots, Peas, &c., as well as nearly all the annual flower seeds, will become seriously impaired, if not utterly destroyed by the damp during the long interval of a month and a half at least that must elapse before they can be sown. I look upon this as a most essential precaution to be attended to, having witnessed in how wonderfully short a time imported seeds become ruined by exposure to damp. The transmission of seeds by post, when the quantity is small, is an excellent plan.

LOCALITIES WHENCE IMPORTED.

America.—Very large supplies of vegetable-seed have been for several years past imported into this country from America. The Agri-Horticultural Society derive thence by far the greater part of the large bulk of vegetable-seeds they distribute annually to their members; and the seed has certainly been found in most cases to possess the one great merit of germinating freely. This, however, has, to a large extent, been its main recommendation; for as to the quality of its produce, excepting in some cases, I have found it invariably inferior to that which I have had annually sent out to me from England.

Cape of Good Hope.—The Agri-Horticultural Society used to receive large consignments of vegetable-seeds annually from the Cape. The advantage of procuring them from that country was supposed to consist in this, that they must necessarily be fresher than those obtained either from America or Europe; inasmuch as, if immediately exported after being harvested in that hemisphere, they would arrive in India just in time for our season of sowing; that is to say, they would not be more than four months, or so, old when they reached us; those coming to us from Europe or America being of necessity at the least as much as twelve months old. This advantage was, no doubt, to a great degree realised, as for the most part the seeds germinated vigorously; but at the same time it was far overbalanced by the exceeding inferiority of the produce which the seeds yielded. I for my part considered the seeds of so little value, that, when others could be obtained elsewhere, I never sowed them.

England.—After several years' experience, I may say that seeds of flowers and vegetables procured from respectable English firms cannot be surpassed in quality of produce or germinating-power.

CAUSES OF THE FAILURE OF IMPORTED SEED.

Whole batches of imported seed, however, from whatever quarter of the world they may have been derived, will sometimes utterly fail to germinate. Any one of the following reasons, or, indeed, more than one of them combined, may often be assigned for this.

Sometimes the seeds are old, and all but worthless, as they leave the hands of the seedsman. The mixing with the fresh seed of the year what remains over from previous years was a well-known practice with dealers: but, I trust, among seedsmen of reputation no such dishonesty prevails now. The term "cooking," I am told, I was wrong in applying to the practice. That term refers to something even more dishonest—the mixing of two lots of seed, perfectly similar in appearance, but totally different in kind, such as Rape and Turnip for instance, having first boiled the cheap and worthless kind to prevent its subsequently germinating, and so exposing the fraud.

Bad packing also is, no doubt, one cause from which seeds sometimes perish on their voyage to this country. The tenacity of life in many kinds, though very great, is not such, that all precautions for their safe keeping on the voyage hither need be wholly disregarded.

Again, seed often proves valueless from having been consigned to this country at an improper season. No seed should arrive here long before it is the right time for sowing it; otherwise, though perfectly sound on its arrival, the risk of its becoming bad before being put in the ground is very great. In Bengal this is especially the case; and seed intended to be sown at the commencement of the cold season, that arrives a month or two previous perfectly sound and good, will, if opened and left exposed to the action of the humid atmosphere, be all but sure to fail.

Seeds, however, that in reality are perfectly good when sown are often pronounced to be bad, for one or the other of the two reasons: First, from having been sown too soon in the season they have not germinated in the time they were expected. Many of the annuals—Nemophila, and Larkspur, for instance—will not germinate readily, if at all, till the Cold-season is thoroughly set in; and, if sown earlier, will lie dormant in the soil till the due time arrives. Celery-seed, again, that is sown in August (as it should be for cultivating the vegetable) will come up but very sparingly, after having been more than a month in the ground; whereas portions of the same seed, reserved till the cold season and sown then, will come up plentifully in about twelve days.

Secondly, seed sown in the open ground is often judged to have been bad from its having shown no growth; whereas the whole sowing, soon after it was made, has been destroyed by vermin. In some localities,

where red-ants abound, if Lettuce-seed or the small seed of any of the annuals be sown, in a very few hours scarcely a grain will escape being made away with by these destructive insects. The seedlings of some plants, moreover, particularly those of a succulent nature, such as Beet, Nolana, the Ice-plant, &c., are very liable to be eaten up entirely by sparrows, before even it is observed that the seeds have germinated.

The following methods of testing the age of seeds—especially of culinary vegetables—are recommended by the *American Agriculturist*, and will be found useful in the cases noted: "When you want new Seed Peas, put one from the stock into your mouth and bite it. If it is very hard it is more than one year old. If the teeth enter it with moderate ease it is new seed. New Carrot-seed always has a green shade on it. Old seed loses this, and is of a dead, pale brown, and less fragrant. New Parsnip-seed has a shade of green, which it loses if more than one year old. Onion-seed is more difficult to prove than most other seeds. But if you take a single seed at a time and carefully bite it you will find that old seed has a tough dry skin, with a very white and harsh kernel, while new seed has a more tender, moist skin, and the kernel possesses a greater degree of moisture, and is somewhat oily. The seed may be cut with a penknife instead of bitten. Onion-seed that has no vitality at all has no kernel, or one perfectly dry. Test this by pressing the seed on a piece of white writing paper. If it leaves no moisture on the paper it is of no use, and has been tampered with, or has lost its vitality by age. New Cabbage and Broccoli seed possesses a pale green shade in the kernel when pressed out or cut, and a tinge of green in the brown skin also. But old seed loses this in proportion to its age, becoming of a dull, dark brown. Cabbage, Broccoli, Kales, &c., will retain their vitality longer than any other seeds, and will grow well when three years old, or even six years, if well kept. Beet-seed has a faint tinge of pale green if new, but is a dull brown if old, and its vitality is very doubtful if old. New Celery-seed has a faint tinge of green, and is very aromatic, but it loses the green and becomes less fragrant if more than a year old, and is doubtful."

SEED-SOWING.

The best method of sowing will, to some extent, depend upon the kind of seed to be sown. Directions for the sowing of seeds of flowering annuals and culinary vegetables will be given, when those plants are respectively treated of. In the meanwhile, the following suggestions in a general way may, perhaps, be found useful.

Seeds of any size, such as those of Broad Beans, Yellow Lupins, and of very many shrubs and trees, the rinds of which have become hard and tough by keeping, if sown in rather dry soil, will remain a very long time before they germinate. It is an excellent plan to throw seeds of this description in a basin of hot water, pick out those that float, and throw them away as useless; let the rest steep for twelve hours, and then immediately sow them.

When pots or seed-pans are used, about the best soil for sowing seeds in, and the one most generally available in this country, will be found, I believe, to consist of one part leaf-mould, one part common garden-earth, and an eighth part silver-sand, well mixed. A light soil, for covering the seeds with may be made of equal parts of coarsely-pounded charcoal and leaf-mould. If the seeds remain long before they germinate, the charcoal will have the tendency to keep the soil from becoming green and sour, as it so often does from continued watering.

It is laid down as a rule by some of the best gardeners in this country, as well as elsewhere, that seeds should always be sown in what is called a "dry bed." Mr. R. Scott at the Calcutta Botanical Gardens used, during the hot months, to lay up under a shed, and sheltered from wet, a store of dry earth, that he might have it, as he said, in a perfectly dry state on all occasions for his sowings. Mr. J. Newman, of the Botanical Gardens at the Mauritius, says:—

"I find that all seeds, particularly those that have come a long voyage ought to be sown in moist, but not *wet* earth, and not watered for three days after sowing. In wet weather it is advisable to have matting to cover the seed-beds until the plants have appeared above ground, when they may be watered as usual. By this simple precaution, even many old seeds will vegetate; whereas seeds sown in wet earth, or watered immediately, frequently rot, by having so much water at first. I have tried seeds from the same packet in a dry place and a wet one at the same time, and it requires only one trial to prove the superiority of the former."*

This certainly does not accord with what has been my own experience; nor in the North-Western Provinces would it be altogether practicable, on account of the dryness of the climate, and of the light surface-soil, with the seeds in it, being liable to be blown away by the wind. The practice, which I have found uniformly attended with success, has always been, except when moist enough not to need it, to drench the soil immediately previous to the sowing.

I should certainly hesitate, however, in recommending this practice had I not the sanction of those whose opinions on such a matter ought to have far greater weight than my own. Mr. R. Ross, formerly head gardener of the Botanical Gardens, says in his directions for the

* 'Transactions of the Agri-Hort. Society,' Vol. II, p. 76.

sowing of seeds: "When sown, give a little water, with the fine rose of a watering pot: afterwards keep damp, but not wet."* And Mr. M'Meekin, formerly head gardener of the Agri-Horticultural Society, speaks of his success in raising annuals from actually flooding the ground "when the seeds were sown;" a treatment which Mr. John Scott strongly condemns as opposed to theory and practice.† And lastly Mr. John M'Elroy directs even for the humid climate of England: "before you sow the seed, 'let the soil be well soaked with water.'"‡ It appears to me that if proper attention be given to drainage, the only effect of the soil being in moist condition when the sowing is made, is to soften the hard integument of the seed and thus enable it to germinate the more speedily. Unless the soil be drenched to excess, so as to be kept in a sodden state, it will be found, except perhaps during the Rains, to dry up far too soon for the seed to rot through wet.

Pots in which seeds are sown may be, and indeed are the better for being, kept in a dark place till the seeds show indications of germinating. They should then be immediately removed to where they may have as much light and air as possible, provided they be sheltered from strong winds, heavy rains, and direct sunshine.

POTS AND POT-CULTURE.

For the cultivation of some of the choicer kinds of plants, as well as for seed-sowing, pots are absolutely necessary. As utensils of earthenware, similar to that of which flower-pots are made, are in universal use among the natives, potters are always to be met with. Hence pots may, nearly everywhere, be easily obtained to order, at a very reasonable rate. The pots, however, vary much in different localities as regards the goodness and durability of the material of which they are made. Some soon break to pieces by any little force applied to them, or crumble away by exposure to weather; while others have a ring like that of a bell, and last uninjured for a great length of time. Much depends, I believe, upon the quantity of salt existing in the earth of which they are made. It is advisable to have a large stock in hand of all sizes, ranging from the smallest to the largest. These should not be allowed to lie out, neglected and exposed to the weather, but should be stored neatly away, somewhere under cover, ready for use when wanted. Any old pots, likewise, when out of use,

* 'Journal of the Agri-Hort. Society,' Vol. V, p. 1.
† 'Journal of the Agri-Hort. Society,' Vol. I., New Series, p. 192.
‡ 'Gardener's Magazine,' conducted by Shirley Hibberd, for 1866, p. 296.

should be immediately well washed and put away. Uncleansed, dirty pots are condemned by all good gardeners.

For the sowing of seeds, broad and shallow pots are obviously the best adapted. In the bazârs wide, round pans, somewhat of a pie-dish form, may commonly be met with at a very cheap price, excellently adapted for the purpose. They must, before being used, have a small hole broken through the bottom for drainage. Pans of this description are also of the greatest use to hold water for pots with aquatic plants to stand in.

SEASON FOR POTTING.

With regard to the season most suited for potting, the following very important directions are given by Sir J. Paxton :—

"There ought to be no such thing as a fixed period for universal potting. Each specimen ought to be treated according to its individual wants. No specimen should be re-potted till it begins, or is about to begin, growing."*

"Potting is too frequently determined by date of month instead of by progress of the season and state of vegetation.

"It is an infallible maxim that plants should not be re-potted till some enlargement or development of their organs is apparent.

"Early potting is injurious to plants. Water is liberally supplied when they are wholly unprepared for its absorption. Thousands of tender plants are annually thus destroyed. If the potting be deferred till vegetation has commenced, plants will imbibe and evaporate the water applied with all requisite facility. They will receive no check if the potting be skilfully executed.

"By potting at the proper period, the appearance of the plant will indicate the nature and extent of its subsequent growth, and the size of the pot required."†

"Ordinary plants producing numberless fibrous roots, which are rather benefited by nearness to the outside of the pot, should be often and very gradually shifted.

"The only circumstance which can justify re-potting is a decided indication of growth. Woody and herbaceous species must, like the Orchidaceæ, never be potted till they show signs of advancement.

"A few exceptions may be made in the case of tuberous-rooted or bulbous perennials, which may be potted immediately before the period at which they usually form roots, as it is necessary to take away the dry soil in which they have been preserved, and to supply them with fresh, till they can be watered freely."‡

Notwithstanding the unquestionable accuracy of the above remarks, it so happens that in India there are especial seasons suitable for removing most kinds of plants. As a general rule for guidance it may be observed, that plants that are natives of a cold climate, and that

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* 'Magazine of Botany,' Vol. X., p. 48. † '*Ibid.* Vol. VI., p. 71.
‡ 'Magazine of Botany,' Vol. VIII., p. 47.

are in the full vigour of their growth during the cold season in this country, should be re-potted at the commencement of the cold season —some time in November; and that plants that are natives of India or of a similar hot climate are best re-potted either in February, at the commencement of the hot season, or about the end of June, at the commencement of the rains.

The necessity of re-potting a plant, if the pot that it is in be not unmanageably large, may be easily determined by turning the ball of earth entire out of the pot, and examining the roots. This is done by passing the base of the stem through the middle fingers of the right hand, and then turning the pot upside down, and knocking the rim of it gently upon the top of a wall, or upon the edge of a table, till it can be lifted clean off by the left hand. "It is a standing principle," says Sir J. Paxton, "with experienced culturists, that no specimen should be allowed a larger pot till the one in which it is growing is filled with fibrous roots; and that subsequent shifting be trifling and oft-repeated, in preference to only one or two abrupt transitions annually. This is one of the prime secrets in the right management of flowers—the *sine qua non* to distinguished or even common success in cultivation."*

"If the soil," he further says, "be closely compressed into a hard mass, it must be shaken from the roots. For this put the base of the ball on the ground, and strike gently all round with the hand. All plants that are thus freed from earth, ought not to be planted in larger pots."

OPERATION OF POTTING.

When plants are merely to be removed from one pot into another, if the operation be at all carefully performed, they will suffer scarcely the slightest check in consequence. But if plants be dug up from the border to be potted, they require some little attention to be paid to them afterwards, on account of the injury almost of necessity done to their roots. The best plan is to put them, as soon as potted, in a dark room or godown during the day, and bring them out into the open air at night. By this mode of treatment they will mostly recover themselves in two or three days.

Plants, again, that are purchased of native nurserymen or dealers, are nearly always delivered with their roots kneaded up in a ball of dense, clayey kind of earth. If the plants be potted in this condition, just as received, it will probably be many months before the roots will be able to overcome such impediment to their free growth. The only way that I know of removing this dense clayey ball, without

* 'Magazine of Botany,' Vol. VII, p. 35.

in the least injuring the roots, is to immerse it in a vessel of water. In about an hour's time it will dissolve and loosen away, and upon the plant being gently shaken, leave the roots quite free and clean. The plant should then, without a moment's delay, be potted—care being taken to press the soil close round the roots, and then to supply a copious watering. The plant should be removed to a dark room, to be kept there during the day, and put out at night, till found that it can bear the light without flagging.

In preparing a pot to receive a plant, the first thing to do is to put in it broken pieces of potsherd, charcoal, or old mortar or concrete —the last for preference—to the height of fully an inch and-a-half for the purpose of drainage. Care must be taken that what is placed immediately above the hole be a crooked piece of potsherd, and not a flat piece of tile, such as mâlees often lay on, thus effectually closing the hole, and impeding drainage. Above the layer of broken potsherds or charcoal spread a small quantity of dry moss (if to be had), or cocoa-nut fibre, or any similar material, to prevent the soil that is to be put in from immediately falling into and clogging up the drainage below. For the information of those who do not understand the operation of potting, I give the following directions :—Having got your pot ready with the material for drainage, and having the soil handy, take the pot containing the plant to be re-potted, and upset it on to your right hand palm, passing the stem of the plant through the second and middle fingers ; then gently knock the rim of the pot against any hard substance until the ball of earth containing the roots rests loosely on your palm. Then remove the pot with your left hand. If the soil round the roots has become a hard mass, stand it in a basin of cold water if in the summer, and in tepid water if in winter, until the roots are quite free from the earth. Then, having filled in sufficient fresh soil into the new pot so as to allow the roots to rest on it, and leave an inch space at the top between the rim of the pot and that portion of the stem, immediately above the soil, hold the plant to be potted in the left hand in the new pot, taking care to have it as much as possible in the centre ; then having gently spread out the roots in the pot, commence filling in the fresh soil, giving the pot an occasional shake to allow the soil to settle firmly round the roots, until within an inch of the rim. Then press down the soil, firmly but gently, so as not to injure the roots. Having done this, knock the bottom of the pot once or twice on the potting table, and then give a copious watering with a fine rose, after which, place the newly-potted plant in a shady situation, where the sun's rays cannot get to it, until it begins to show signs of starting into new growth, when it may gradually have sunshine. I can safely say, that by this method of potting, I have never lost a plant. The same process should be followed in the case of

plants, the roots of which are not in a hardened mass, with this exception, that only the superfluous soil and crocks are to be removed before placing the plant in the new pot. I have always made it a rule never to allow the soil, usually found pressed round the roots of plants purchased from itenerant native plant dealers, to remain, but have always removed it by soaking the ball of earth in water. Whenever you find a potted plant in an unhealthy condition, change it into a fresh pot and soil. I recommend this as a general rule. There are, of course, certain conditions to be observed; such, for instance, as to whether the plant is too much in shade, or whether the soil is too wet, or too dry below the surface, &c. But the remedy of potting afresh I have invariably found served the purpose in view, viz., that of encouraging a healthy growth.

The soil best adapted for the general run of potted plants is common garden-loam, with which are well mixed and incorporated about one-eighth of vegetable mould, the same quantity of well-rotted cow-dung, and a little silver-sand. To keep the soil open, nothing better can be mixed with it than a small quantity of garden-refuse, charred and broken into rather small pieces; or better, old mortar or concrete, broken into pieces the size of peas and hazelnuts.

Hot water for curing sickly plants has been much used lately. In the London *Florist* a short time ago the following paragraph on the subject appeared: "M. Willermoz some time since stated that plants in pots may be restored to health by means of hot water; ill-health, he maintains, ensues from acid substances in the soil, which, being absorbed by the roots, act as poison. The small roots wither and cease to act, and the upper and younger shoots consequently turn yellow, or become spotted, indicative of their morbid state. In such cases the usual remedy is to transplant into fresh soil, in clean pots with good drainage, and this often with the best results. But his experience of several years has proved the unfailing efficacy of the simpler treatment, which consists in watering abundantly with hot water at a temperature of 145° Fahr., having previously stirred the soil of the pots so far as may be done without injury to the roots. Water is then given until it runs freely from the pots. In his experiments, the water at first came out clear; afterwards it was sensibly tinged with brown and gave an appreciable acid reaction. After this thorough washing, the pots were kept warm, and the plants very soon made new roots, immediately followed by vigorous growth."

WATERING OF POTTED PLANTS.

There is no operation in horticulture that requires judgment more than the giving to a plant just the amount of water beneficial to it, and no more. If too little be given, the plant will be starved and

stunted; if too much, it will rot and die. As a general rule, the quantity of water a plant demands depends entirely upon the more or less vigorous state of growth it is in at the time. When observed to be making no growth, only just water enough should be given to keep it alive; when showing symptoms of starting into growth, then is the time to supply water with a liberal hand.

It is during the rains that the greatest difficulty is experienced. Plants that are natives of a cold climate, especially herbaceous ones and perennials, such as Geraniums, Carnations, &c., at this season, though in all but a dormant condition, cannot exist in a soil that is perfectly dry; and yet, when kept under shelter, are very apt to perish from the soil turning rank and sour, however little the water supplied. When the drainage of the pots in which such plants are grown is perfect, the plants will sometimes do even better put out and fully exposed to the rains; for in that case, the soil, though constantly drenched, does not become sodden with wet, nor ever otherwise than sweet and wholesome.

In watering plants, especially young delicate plants, it is advisable to use a watering-can with a fine rose. The ordinary roses attached to cans sold in the bazâr are worse than useless for watering potted plants with, as the water rushes out with so much force as to cause considerable damage to the roots. It would be worth while having a brass rose specially made with very fine holes, which could be attached to any watering pot. A little expense incurred in the purchase of a few really good cans, will save the lives of hundreds of plants. But it cannot be too strongly impressed upon mâlees that it is the roots of the plants that require water, and not the flowers or leaves, to which they often so injuriously apply it. The only object in casting water upon the leaves is to cleanse them of dust and dirt, so as to keep open their pores for respiration. But the pores being situated principally upon the under surface of leaves, the dashing of water upon them from above is not a very effectual mode of operating.

The only perfectly effectual mode of cleansing the foliage of a plant is frequently (once a week, perhaps) to wash each individual leaf carefully and tenderly with sponge and water above and below. But upon this subject I cannot do better than subjoin what is stated by Dr. Lindley:—

"It is well known to gardeners that the efficiency of leaves is much promoted by their being kept clean. The great cause of the unhealthiness of plants in towns is the amount of dirt which unavoidably collects upon their surface. If such impurities are constantly washed off, plants will grow as well in cities as in country places. This was found exprimentally by M. Garreau, who, in the course of his inquiries into the functions of the skins of plants found that soap and water had great value, plants well washed

acquiring a power of absorption much beyond what they possessed in their unwashed condition. It was found that soap and water had a far greater cleansing effect than mere water; thus a fig-leaf which had been lathered, absorbed 90 parts, while after a mere water-bath it took up only half the quantity; and a bramble, which soap and water provided with 130 parts absorbed, could only consume 10 parts when cleansed with water alone. It was thus shown that perfect cleanliness is as indispensable to plants as to animals, and that dirty gardening is necessarily bad gardening. Plants breathe by their leaves, and if their surface is clogged by dirt of whatever kind, their breathing is impeded or prevented. Plants perspire by their leaves, and dirt prevents their perspiration. Plants feed by their leaves, and dirt prevents their feeding. So that breathing, perspiration, and food are fatally interrupted by the accumulation of foreign matters upon leaves. Let any one, after reading this, cast an eye upon the state of plants in sitting-rooms, or ill-kept greenhouses; let them draw a white handkerchief over the surface of such plants, or a piece of smooth white leather, if they desire to know how far they are from being as clean as their nature requires. Half the business of a good gardener consists in sponging and washing the leaves of his plants."*

I will only observe, in addition to this, that there is no place where plants are more liable to get into a filthy condition than where those of the choicest kind are usually kept, that is, in the verandah of a house. This place, as well as the ground immediately in front of it, is swept out every morning by the mehter, when a fresh and abundant deposit of dirt upon the leaves of the plants is the inevitable consequence. How deleterious this must be to many of the Orchids, which in their native homes live high up on trees far out of the region of dust and dirt, may easily be conceived.

Sir J. Paxton advises "to maintain a regular supply of moisture, and likewise obviate the necessity of pouring water on the soil, so as to endanger the rotting of the plant at its base, each pot should be furnished with a pan filled with water. Specimens are preserved sometimes in this way with the greatest security, as the mere application of water to the surface of a pot, in which a delicate plant is growing, often causes it to decay at the juncture of the stems and roots."† A modification of this plan I have for some time past adopted, and found highly advantageous, especially with flowering annuals, in the month of February, when the weather begins to become hot and dry. At that period though the mâlee, when not watched, often does little more than just sprinkle the surface of the soil, still, by any amount of watering from above, it would be almost impracticable even so much as to damp the roots at the bottom of the pot.

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* 'Theory and Practice of Horticulture.' p. 58, 2nd Ed.

† 'Botanical Magazine,' Vol. VIII, p. 227.

Several earthenware glazed pans, of the same depth as the flower-pots, are procured from the bazâr. These are filled with water just so full that, when a flower-pot is placed in one of them, the water rises up to a level with the rim of the flower-pot. Each flower-pot may be allowed to remain immersed about six hours, by which time the water will force itself up through the hole at the bottom of the pot, and thoroughly saturate the whole contents of the pot. All the pots are thus placed in the waterpans in succession, and watered effectually. A plant that has been thus treated will not require water again for three or four days. There need be no fear of the plants suffering from water lying stagnant at their roots, concerning which such strong cautions are usually given by those who insist upon the necessity of thorough drainage, as the water will dry up by evaporation long before it has time to stagnate. An advantage, moreover, resulting from this mode of occasionally watering potted plants of all kinds is, that the action of the water, forcing its way upwards, tends to loosen and lighten the soil, counteracting that compression to which it has been subject, from the daily beating down upon it of water from the watering-pot.

Sometimes, when water has to be fetched from a distance for watering potted plants, a bhistee is employed to go round with the mâlee to refill his watering-pot from the *mushuk*, immediately that it becomes empty. This will be found a very bad arrangement. The bhistee, to get the work over as soon as possible, when not observed, will water the pots himself from his *mushuk*, and thus, by the violence of the water dashed down upon them, often destroy tender and valuable plants. I have entirely obviated the difficulty by purchasing from the bazâr an earthenware vessel, the largest that could be procured, capable of holding, perhaps, four or five *mushuks* full of water. This was sunk to the rim in a spot close to where the potted plants were placed, and the bhishtee directed to fill it every afternoon with water. The mâlee dipped the watering-pot into it when he pleased, and supplied himself without difficulty or delay. The earthenware vessel must have its sides supported by being sunk into the earth, or it would soon break to pieces by the weight of the water within it.

DRAINAGE OF POTTED PLANTS.

There is no point the importance of which is so strongly insisted on by all gardeners as the drainage of potted plants. The usual means, however, adopted for the purpose prove in this country often utterly ineffectual; the materials placed at the bottom of the pot, such as pieces of brick, charcoal, and potsherds, failing to act in the way of drainage altogether. For in the first place, during the hot season, from the constant daily watering that is indispensable, the upper portion of the soil in the pot becomes so dense and compact, that no

water, however liberally supplied, makes its way down to the drainage, or even to the soil for some height above it. A partial remedy for this is to lay flat broken pieces of potsherd, old mortar or concrete, or small clinkers, over the surface of the soil. The water then falls with all its force upon these, and trickles between them into the soil below, without any great tendency to solidify it and render it impervious. And, again, during the rains, if potted plants be put out, with the bottoms of the pots resting upon the ground, or, indeed, upon *any flat* surface, no water will ever pass out of them from below. Upon this point one may easily satisfy oneself by merely placing out an empty flower-pot in the rains. It will soon become filled with water, which will remain in it very many days, till dried up by evaporation. Such being the case with an empty pot, how much more is it likely to be so with one that contains anything within it.

One remedy for this is, of course, very obvious, being merely to lay two bricks side by side, about three or four inches apart, and upon them place the pot with the hole just half-way between. This also serves to exclude worms, with which, when pots rest upon the ground in wet weather, they soon become filled. Another remedy is to have pots made with drainage-holes round the side, about an inch from the bottom.

For **Begonias, Achimenes,** and choice and tender plants of that description, which require the shelter of a verandah, an excellent method, as shown in Fig. 19, is to procure a shallow pan for the plant to grow in, and to drop it into a flower-pot, about double its depth, so that the rim of the pan rests exactly upon the rim of the flower-pot. By this means drainage is rendered effectual, and insects are excluded.

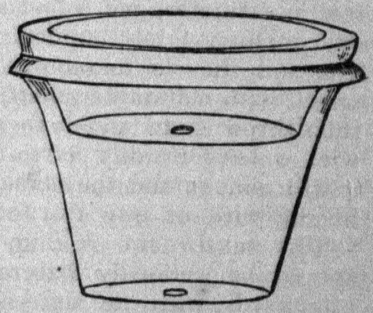

Fig. 19.

Dwarf choice plants, such as **Tetranema,** it is always desirable to grow in pots correspondingly small. To prevent the fluctuations of temperature consequent upon speedy evaporation in pots so small, it is usual to plunge them in larger ones filled with sand.

PLANTING.

SEASON.

Planting consists, for the most part, in transferring young shrubs or trees from the pots, in which they have been growing, into the

places in the open ground where they are to remain permanently. This, with many plants of a robust nature, may be done almost indifferently at any season. But the two seasons more especially suited for the operation are the setting in of the rains, and at the commencement of the Cold-season. As a general rule, it may be laid down that plants, natives of this country, are planted out most successfully just previous to their breaking for their summer growth, a little after the commencement of the rains; while plants, natives of a colder climate, and that are in the greatest vigour of growth during the Cold-season, as roses, for instances, should be planted out about October. Most plants of the former class may, however, be planted out in February, but in that case those of a less robust habit demand a vast deal of attention, both in sheltering them from the sun, and in keeping them well watered during the hot months.

PREPARING THE GROUND.

The usual method with mâlees, if not looked after, when planting out a young shrub or fruit-tree, is to dig a hole in the ground only just large enough to receive the ball of earth in which the roots are contained; whereas the proper plan is to dig the hole as much as two feet in diameter, and a foot and a half deep, for moderate-sized shrubs, and proportionately larger for those of a larger size and for fruit-trees. The soil that is taken out should be broken up somewhat small, and mixed with old stable refuse, decayed cow-dung, and rotten leaves, and then thrown into the hole again. If the ground be then drenched with water for a day or two previous, it will sink to the level at which it will remain, and the plant may be put down at once to the proper height without any fear of its crown becoming buried beneath the soil by subsequent sinking, as might otherwise happen. The plant should be copiously watered at the time, and for some little time afterwards, when the soil becomes dry.

TRANSPLANTING.

The following remarks by Sir J. Paxton, on the advantages of transplanting, are as applicable in this country as they are in Europe :—

"It is an admirable plan," says he, "to move a plant yearly from place to place, so that it never remains more than one year in the same spot. Each specimen should be annually shifted from the precise mass of earth in which it is growing, if it be even taken to merely a few yards. We are decidedly of opinion that on the last circumstance the success of all experiments in gaining a superior race of plants is more dependent than on any of the properties of the soil, although these must be taken in to account as auxiliaries. Closely connected with the annual removal is the division of the plants; if

herbaceous, the destruction of the central and older portions, which become feeble and advance towards decay, and the transplantation only of the young exterior and healthy parts. For some kinds this care may possibly be superfluous, for others it is essential."*

There are few things in which the mâlee will manifest his indolence more than when employed in transplanting. If not keenly watched, he will, to make easy work of it, begin digging round the plant almost close to the stem, so that the ball of earth he has to take up be as small as possible, cutting through or tearing away all the large long roots that come in his way, rather than extracting them carefully out.

In lifting a plant great care and often much patience are required, so that the roots sustain the least possible injury. It will sometimes, however, unavoidably happen that the roots become so much broken or disturbed in the operation that the plant would suffer severely, if removed at once to the spot intended for it, and immediately exposed to the sun and air. In such case it will be found advantageous to put it into as small a pot as will contain it, fill in the pot with soil, and well water it; then convey it to a darkened room, and keep it there during the day, bringing it out in the evening to remain in the open air and receive the benefit of the dew during the night. After a few days it may be left out in some well-shaded spot during the whole day, and in no great length of time, when its wounded roots have become healed, it will bear any amount of exposure. It may then be shifted from its pot, and planted in the place where it is intended to remain. The worst it will have suffered will be merely the temporary shedding of its leaves.

The following method is recommended as one of remarkable efficacy in reviving plants dried by having their roots too long out of the ground.

"In a tub holding about 20 gallons, fill three-fourths full with water. Add 20 lb. weight of cow-dung, mixed with an equal quantity of fine rice soil. By working the mixture for a long time and carefully, you reduce it to the consistency of whitewash. In this steep the roots of your plants just before putting them into the ground. The earth thrown after them into the hole sticks to the roots which immediately begin to swell. At the very first movement of sap rootlets appear through the coating, which gives them immediate manure; and not only brings on, but secures the further formation of roots."†

CUTTINGS.

SEASON.

Some plants may be propagated by cuttings at nearly all times of the year, but the majority most successfully in the rains. Some of our choicer plants, natives of a cold climate, and that are in vigorous

* 'Magazine of Botany,' Vol. IX, p. 86.
† 'Gardeners' Chronicle,' May 21, 1859.

growth only in the Cold-season, cannot be multiplied by cuttings successfully except at that season.

Cuttings, for instance, of **Stephanotis** strike readily in the rains, and cuttings of **Habrothamnus, Aloysia,** and **Verbenas** in the cold season; but put down the former in the cold season, and the latter in the rains, and in neither case will they succeed.

DESCRIPTION.

Some cuttings strike so readily that it is almost immaterial how they are put into the ground. But most cuttings, it has been ascertained, strike more readily by being inserted sloping-wise into the ground, than when they are planted upright. Indeed it is well to lay them so sloping-wise, that their summits be not more than an inch high above the ground, and then earth up, and cover all but the two upper most buds. The cuttings thus protected are not nearly so liable to become dried up and to perish, as when almost their whole length is left exposed to the air.

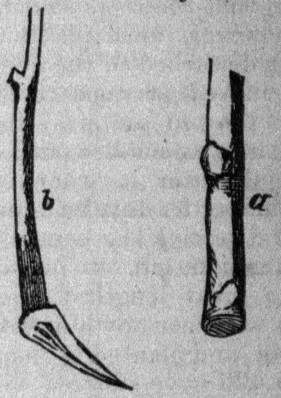

Fig. 20.

The end of the cutting which is to be inserted in the soil should be cut across with a clean cut just below a leaf-bud (Fig. 20, *a*). Some gardeners are of opinion that slips strike more readily than cuttings. A slip is a small shoot pulled off a plant at its point of junction with the stem, bringing away with it a heel of wood and bark from the stem (Fig. 20, *b*).

None of the leaves, or as few as possible, should be removed from the upper end of a cutting, (as in Fig. 21.)

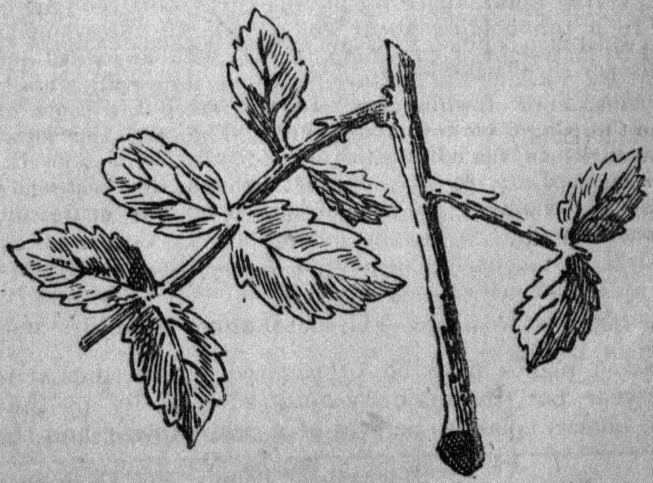
Fig. 21.

Miss Maling describes a method of treating cuttings, which she says is an American discovery, and a most efficacious one :—

"Lay a set of woody cuttings either amongst slightly-damped moss or else in a wide-mouthed bottle with a piece of damp sponge at the bottom of it; the cuttings being dropped lightly in, are left for ten days or a fortnight in a cool, airy place. A piece of muslin should be tied over the bottle to exclude dust and insects, but allowing air to enter.

"When what gardeners term a slight callus is formed, the cuttings are all but safe, and put out healthy roots they are potted directly. A heap of dampish moss or Cocoanut fibre does as well as the bottle plan, only the air must not be quite excluded, and no chance must be allowed of mouldiness. *

The age or condition of the wood from which cuttings are most suitably taken varies according to the nature of the plant to be propagated. On this point Sir J. Paxton observes :—

"Some propagate freely by—

1. Cuttings of the young and tender wood; as **Melastoma, Barleria, Astrapæa, Inga, &c.**

2. When the wood begins to assume a brownish colour, or is half-ripened as **Ixora, Bauhinia, Passiflora, Ruellia, &c.**

3. Some only strike freely when the wood is perfectly ripe; as **Grevillea Blaken, &c.**" †

CHARACTER OF THE PLANTS PRODUCED.

On this subject Sir J. Paxton affords the following very valuable information :—

"In plants, where there are two kinds of branches, one sort ascending and another branching along the ground like runners of Strawberries, the difference is much the same as that between common shoots and suckers in ordinary shrubs and trees.

"The lower trailing shoots, employed for propagation, form plants very like those from suckers; healthy, vigorous, and disposed to occupy a large space, without blooming.

"Cuttings of the upper shoots produce flowering laterals in a very short time. And a fine blooming specimen may even be raised in one season by taking off the extremities of the longest shoots as cuttings. Indeed the dimensions and early blooming of the plant may be regulated by the distance at which the cutting is taken from the main stem.

"Cuttings from the extremity flower speedily, and in a dwarf condition.

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* 'Indoor Plants, and how to grow them,' p. 12.

† 'Magazine of Botany,' Vol. II, p. 55.

"Cuttings from a shoot in an early stage of its growth will constitute larger specimens, and be longer in bearing flowers."*

METHODS OF STRIKING AND SOIL.

A large number of the plants kept for distribution in the gardens of the Agri-Horticultural Society are raised from cuttings laid down in common garden-soil during the rains in an open situation without shelter either from sun or wet weather. And possibly a situation thus exposed to the full action of the atmosphere is the very best for them; for of all things most baneful to cuttings is that tendency in the earth to become sour, which occurs during the rains, in situations at all sheltered and secluded. The native nurserymen I have observed, in striking their cuttings, make use of a mellow soapy description of clay, seemingly the substratum thrown up in the cleaning of tanks. This appears to be singularly tenacious of wet, and yet to have no tendency whatever to turn sour.

To propagate the choicer kinds of plants, however, a more careful mode of proceeding must be adopted. Cuttings of these put down in the open ground will not succeed, but require to be struck in sand, under glass. The method of effecting this on a large scale, adopted by Mr. Ross, formerly head gardener of the Calcutta Botanical Gardens, is described by him at considerable length in the 'Agri-Horticultural Society's Journal,' Vol. II., p. 384. This method, briefly stated, is as follows:—A small piece of ground in an open situation is enclosed round with a wall two feet high. This is filled in with the finest sand procurable. In the sand the cuttings are inserted, well watered pressed down, covered with bell-glasses, and shaded with a roof of matting, fixed about two feet above them. "The glasses," Mr. Ross says, "are not to be taken off more than once or twice weekly to give water, and keep the cuttings clean of any decayed leaves."

An improvement upon this plan now in use in the Calcutta Botanical Gardens, and in the gardens of the Agri-Horticultural Society, is to fill small pots with sand, place the cuttings close around the inside of them, sink the pots to the rim in the bed of sand, and cover them with bell-glasses. When the cuttings are struck, the pots may be taken out, and other pots with fresh cuttings fitted into their places. In this way, when the cuttings are removed, the bed of sand is not disturbed, as it would be were pots not employed. Moreover, it is maintained, that cuttings strike far more readily by being laid in contact with the sides of the pots.

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* 'Magazine of Botany,' Vol. VIII, p. 205.

Of course, the same end may be obtained by more simple means than the above; for, except in point of convenience, the result will be the same if the pots of sand, with the cuttings in them, be sunk in the earth in any suitable spot in the garden, and there covered with bell-glasses and shaded.

One of the simplest modifications of the above plan is to fill a flower-pot half-full of sand; insert cuttings of length sufficient to reach, within a little, the rim of the pot; sink the pot in the earth, and cover with a pane of glass. Each morning the under side of the glass will be covered with condensed moisture; all that is required is to turn it upside down. Sir J. Paxton states: "Mr. Mearns first recommended this, and found it answer so well that he greatly prefers it to any other covering."*

The sinking of the pots to the rim I consider of great importance; as one point essential to success in striking cuttings is that the soil in which they are inserted should, if anything, be of a somewhat higher temperature than the surrounding atmosphere. Whereas if the pots be left above ground, the evaporation that takes place through their porous sides must necessarily much reduce the temperature of the soil within them, and so be very prejudicial to the cuttings.

Sir J. Paxton also observes:—

"1. All hard-wooded kinds of plants make roots best in clean sand.

"2. Soft-wooded require a light soil."†

Mr. Errington, sometime head gardener of the Agri-Horticultural Society, informed me that of some thousands of cuttings he put down one year in pure sand most succeeded; but that in the following year nearly all that he so put down failed. He, therefore, had adopted the material employed in the Botanical Gardens, which, he said, uniformly proved efficacious; that is to say, three parts of sand to one of fine charcoal. This, then, in all cases will be the material safest to use. Notwithstanding, I fancy, in the instance where Mr. Errington failed with sand only, the sand was not pure; as, indeed, it hardly ever can be when used just in the condition in which it is brought from the bed of the river. And the greater or less degree of impure matter incorporated in the sand may make all the difference in the cuttings for which it is employed, not succeeding in one case, and succeeding in the other. I have myself on occasions well washed the sand; and it needs only to do so to find out how far from pure it is; but this is a very troublesome operation, which the admixture of a little charcoal renders needless, as it is the nature of charcoal to correct all impurity.

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* 'Magazine of Botany,' Vol. I, p. 159.

† 'Magazine of Botany,' Vol. II, p. 55.

Bell-glasses were not easily procurable in this country some years ago, and therefore a very cheap and effective substitute for them was easily obtained from any tinman in the bazar. This consists simply of a four-sided glass lantern, with the bottom removed, and a roof of glass instead of the tin one. The apertures between the glass and the tin frame-work must, of course, be well closed up with putty.

For the propagation of cuttings, the following contrivance, of which a representation in section is given in Fig. 29, is the one that, in preference to all others, I have come at last to adopt.

Procure a wide, shallow pan, and lay at the bottom of it a quantity of crocks, potsherds, &c., , for drainage. Over the drainage, near the circumference, put a layer of equal parts of leaf-mould and sand, and then fill the pan to within half an inch of the rim with pure sand. Put in the cuttings with their bases against the side of the pan, just above the mixture of leaf-mould, and sloping, so that their summits project out of the sand in a small circle in the centre of the pan. Then put down a hand-glass just large enough to enclose the circle of leafy ends. Sink the pan to its rim in the earth in some shady place, and water the sand outside the hand-glass daily. Place a piece of matting over the whole at night to prevent the effect of cold from radiation, which would be very injurious.

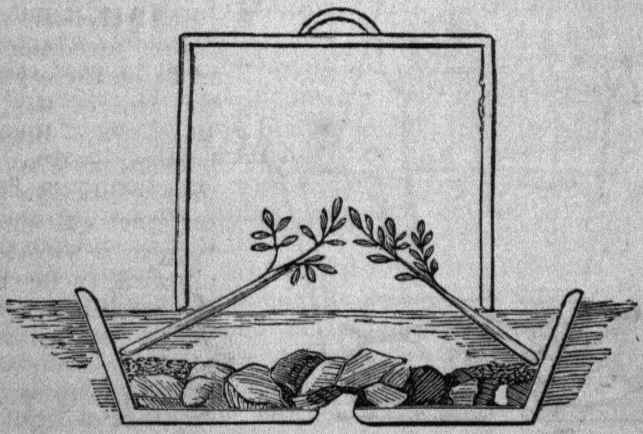

Fig. 29.

The above plan I conceive to possess the following advantages :—

1. The bases of the cuttings are laid where it is recommended they should be —against the side of the pot or pan.

2. Being laid very slopingwise, the cuttings are well covered from the air without their lower ends being too deep in the soil.

3. The hand-glass need not be taken off till the cuttings are struck.

4. In supplying water to the lower ends of the cuttings where it is wanted, none is poured over their leaf ends where it is not wanted and would only be injurious.

5. As water is applied only on the outside of the hand-glass, very little condensation will take place within, and the cuttings will not be liable to suffer on that account.

6. The pan being sunk in the ground, no cold is caused by evaporation from its outer side.

When neither bell-glass nor hand-glass is procurable, the following, as shown in section in Fig. 30, I have found a simple and efficacious mode of proceeding :—

Procure a large flower-pot, and lay at the bottom of it large loose pieces of brick just so high that a small flower-pot placed inside upon them may have its rim on the same level as the rim of the large pot. Fill in the interval between the pots with perfectly dry sand or earth. Fill the inner pot with pure sand, and insert the cuttings. Take another pot just of the size that, when turned upside down, it may fit in on the earth between the rim of the large and small pot. Break out its bottom, and lay over it a piece of window-glass. Water the cuttings as they require it with tepid water, allowing none to fall on the earth between the pots. When condensation takes place upon the pane of glass, merely turn it over.

Fig. 30.

The object in keeping the earth between the pots dry is, of course, that no evaporation may take place from the outside of the large pot, and the temperature within be thereby reduced.

THE STRIKING OF CUTTINGS IN WATER.

This, Dr. Lindley says, is an old practice, and quotes a communication to the *Gardeners' Chronicle*, to show the manner of it :—

"I tie vial-bottles by the necks, and hang them in the windows of our small green-house, having filled them with clean soft water. I then put in slips of Salvia, Calceolaria, Mimulus, Myrtle, or anything I wish to propagate of the same description of plants. In about two or three weeks or a month, the little silver-like roots appear, and in a week or ten days I plant them in small pots well watered; they never seem to flag or mind the change, and I rarely lose a slip."*

Furthermore, Sir J. Paxton observes :—

"The cuttings should be of green wood, taken during the full-growing season; such succeed best, and never flag beneath a hot sun Very young spring-shoots of Erythrinæ succeed in this way. When tubular or fibrous roots appear about the base. transfer to any light soil. Balsams and Dahlias propagate freely. Plants of the Melontribe may be formed in a very short period (sometimes in three days), and being transferred to small pots of heath-mould will produce perfect balls of roots in less than a week."†

I have myself practised this method during the Cold-season with Verbenas, Habrothamnus, Salvia splendens, and Roses, and found no method more successful or less troublesome. The points to be attended to as most conducive to success I conclude to be the following :—

1. That the cuttings be the summits of the youngest shoots in a state of vigorous growth at the time.
2. That capacious bottles be used, so that there be less likelihood of the water becoming foul.
3. That the water be changed often to insure its being quite pure.
4. That when changed it be tepid, so as to afford in some degree the bottom-heat, so essential for the speedy formation of a callus.
5. That the cuttings be sheltered from wind and sun, but otherwise have all the light and air possible.
6. That they be removed out of the cold air into the house at night; and if the bottles be plunged half-way up in a tepid bath, probably, so much the better.

THE STRIKING OF CUTTINGS IN SAND AND WATER.

This is obviously nothing more than a modification of the practice last described, the sand answering no purpose but the mechanical one of supporting the cuttings. Having tried this method during the cold season, and found it in many instances completely successful, I subjoin a few remarks by Miss Maling on the subject, only first

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* 'Theory and Practice of Horticulture,' p. 297, 2nd Ed.
† 'Magazine of Botany,' Vol. IV, p. 182.

observing that for cuttings of plants which take a long time in striking, the sand must be absolutely clean and pure; otherwise it will turn green and sour, and the cuttings rot in consequence:—

"Heliotropes, Verbenas, Lobelias, and Begonias do most beautifully, as do any of the very young soft shoots, when planted in pans of silver-sand, soaked and overflowed with a little sheet of water. Many hard-wooded plants, even hard to strike by other means, will grow in this way well.

"The shoots, taken off as short as possible, and as fresh, and having only the lowest leaves snipped off, if necessary, near the stalk (not close to it) may be struck in all over, and if put in a warm and sheltered place, as over a green-house stove, will grow most rapidly, and make the most charming bunches of little fibry roots. These things will often strike even in small bottles of rain-water, the convenience of which is that they take up so little room Previously to drawing out the little plants, it is well to soak the sand thoroughly to avoid tearing the rootlets. The cuttings raised in sand must, as a rule, have their roots filled in with sand when they are first removed."*

CUTTINGS BY THE AMERICAN METHOD.

This is a method invented by an ingenious American gardener, and has been found very successful in the case of Roses. By its means large numbers of cuttings can be raised at one time. The *modus operandi* is as follows:—Prepare cuttings in the usual way, about six inches in length, cutting close over a bud at the lower end, and strip off all the leaves. Then tie them in bundles according to names of varieties. Prepare a mixture of cow-dung and water of the consistency of cream, and dip the lower ends of the cuttings in it. Then get a deal-wood box 2′ × 18″ × 12″, into which fill three inches of ordinary garden-soil. On this stand the cuttings with their *bottom ends upwards*, and between the spaces fill in ordinary soil to within an inch of covering the cuttings, pressing down firmly. Now take a compost of three parts common soil and one part sand, and fill up the box to the top, thus *entirely covering the cuttings*. Place the box where it can have sun, and water sparingly, so as just to keep the three or four inches of soil on the top moist, but not *wet*. In about seven or eight weeks, almost every cutting will be found to have thrown out roots. To take them out, turn the box over, and lift it off, when the soil will fall away and disclose the cuttings, when they should be potted off singly into small pots as quickly as possible, and placed in a shady situation.

The idea developed in this method is to utilise the heat of the sun for bottom-heat, for the cuttings being placed *bottom upwards* secures this. Fig. 31 illustrates the method. D is the soil at the bottom;

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* 'The Indoor Gardener,' pp. 117, 121.

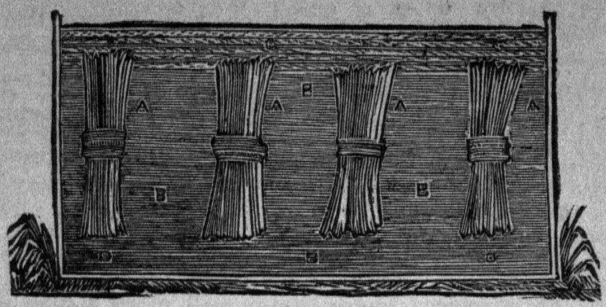

Fig. 31.

A and B the soil between the bundles of cuttings; and C the sand-mixture in the top, into which the cuttings send out their roots. The editor of the present edition has raised thousands of Rose cuttings by this method, only one or two being found not rooted. Care must be taken to select well-ripened wood. The best season to strike cuttings by this method is from the middle of October to December.

PROPAGATION BY EYES.

Many plants may be propagated very readily by eyes or buds. I have mentioned elsewhere that this method has been adopted with great success with the Grape-vine at Lahore, and there is no reason to doubt that it would prove equally successful with many other plants in India. The method is simply to take a plump shoot of the season, on which the leaves are healthy and the buds not yet started. About half an inch or less above and below a bud, cut the shoot sloopingwise into the wood, so that the cut each way may meet just about a quarter of an inch behind the bud. The piece of the shoot, with the bud upon it just as it is, is planted firmly in a pan of sand, with the point of the bud just visible above the surface. It is essential that the bud have a leaf attached to it, which should not be taken off. The sand is kept moistened and the pan covered with a pane of glass. This is a practice that has long been employed in England in raising plants of the Orange tribe, and has proved equally successful with Camellias and Roses.

DIVISION.

There are many shrubs and perennials, such for instance as the Chrysanthemum, which increase by throwing up numerous rooted stems from the ground. Plants of this habit are propagated easily to

almost any extent by what is called "division." This consists in taking them out of the ground and pulling the stems asunder, each one bringing with it a portion of the roots. These stems planted out soon establish themselves as separate plants. Indeed, with plants of this habit the process should be often adopted, whether needed for propagation or not, as the habit itself indicates an effort of nature in the plant to move away to fresh soil from that which it has already exhausted.

LAYERS.

Propagation by layering, though, generally speaking, a slower process than by cuttings, is a much surer one, for there are few plants which, when in a thriving condition, cannot be multiplied by this method. It is obvious, moreover, that larger and more advanced plants may be obtained by layers than by cuttings.

The operation is as follows :—Select a branch of ripened wood of the plant to be layered that will bear being bent down to the earth without breaking. Cut the branch half through with a sharp knife just under one of the leaf-buds towards its extremity, and then pass the knife upwards, so as to slit the branch about an inch or two up. The slit-piece, with the leaf-bud at its extremity, called the "tongue," should be kept open by inserting a small piece of tile. Remove the earth to the depth of two or three inches from, or place a flower-pot over, the spot just where the tongue falls on the branch being bent down; then carefully bend the tongued part of the branch into the earth or into the flower-pot; secure it in that position by a peg, and cover it over with earth, which should be pressed down and watered. It is recommended to head down the branch when layered; but this is not always done. If the layer is put down in the month of February or March, it is very essential that the soil be frequently watered, and never allowed to become dry and hard. What Mr. Rivers enjoins with regard to the layering of Roses may be considered applicable to all layered plants "Have the tongue at the upper part of the shoot, so as not to be in the part which forms the bow, as it is of consequence that it should be within two inches of the surface, so as to feel the effects of the atmospheric heat. Unless this is attended to, the roots will not be emitted quickly."*

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* 'Rose Amateurs' Guide,' p. 153.

A modification of the above process, represented in Fig. 32, I have found attended with great success in layering some kinds of Roses and other plants, the boughs of which are too rigid to be bent down :—

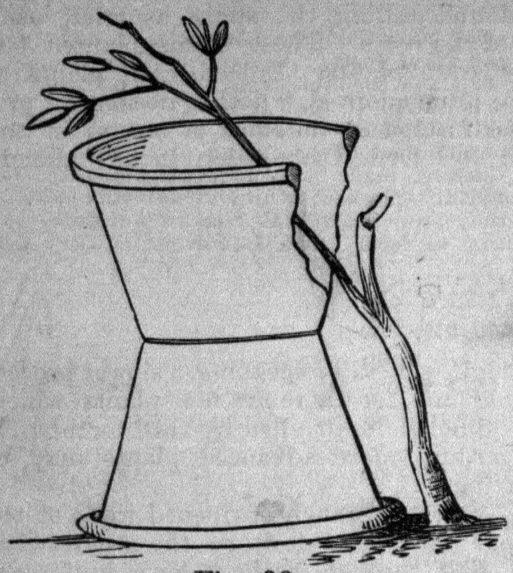

Fig. 32.

Procure a flower-pot which has had part of its side broken out, make a tongue in the branch to be layered, as before directed. Raise the flower-pot up so that the branch, passing through the broken side, may have its tongued part just about two inches below the level of the soil, when the pot is filled in. Keep the flower-pot permanently in this position by some support placed beneath it; insert a piece of tile in the pot where the side is broken away; and then fill in with a mellow soil composed of leaf-mould and sand, which must be kept constantly moist.

For layering any herbaceous plant which roots quickly, such as a Carnation, an ingenious plan is given in 'Le Bon Jardinier' A piece of oiled paper is folded round the stem to be layered, so as to form a funnel, and held together with a couple of pins. Soil is inserted into this, and retained therein by moss thrust into the mouth and kept constantly moist.

A better plan is to have four-inch pots divided into halves vertically like tiles. Pass the branch to be layered through these, tie firmly together, and fill in with good soil. Continue watering regularly, and in six weeks or two months fine plants will be the result.

GOOTEE.

The mode of propagation by Gootee is thus described by Mr. Masters, formerly head gardener in the Calcutta Botanical Gardens :—

"Select a firm, healthy branch, the wood of which is well ripened; and immediately under a leaf-bud take off a small ring of bark, about one inch wide. Scrape the woody part well, so that no bark remains. Apply a ball of well-tempered clay; bind it on securely with a tow or other soft bandage;

make it fast to a stake, if necessary; hang a small pot, having a hole in the bottom, just over the Gootee; and supply it with water daily. In a few months you obtain a fine, well-rooted plant.

"As the fibres are emitted from the buds that are above the wound, they will descend into the ball of earth and form roots. As soon as they are seen protruding themselves through the bandage, the branch may be cut off from the parent tree, and planted where it is intended that it should remain. This appears to be the most expeditious method of obtaining strong well-rooted plants, and, at the same time, is a sure method of procuring duplicates of any desirable variety. Of sixty-five Gootees, made in June, of the **Jonesia Asoca**, the whole were well rooted in October; while of forty-five layers made at the same time, and on the same individual tree, none were well rooted, and some only just beginning to form. The **Leechee** requires four months to form good roots."*

Unless some precaution be taken, the water in the pot above the Gootee will flow out too fast, and very often not fall upon the Gootee at all. To obviate this, therefore, the following contrivance, as in Fig. 33, is commonly resorted to:—

A piece of rope has a knot tied at one end of it; the other end is passed within the pot and drawn through the hole at its bottom till the knot is brought down to fall upon and close up the hole. The rope, thus secured by its knotted end within the pot, is carried on at full stretch and coiled round the Gootee. By this means the water, when poured into the pot, oozes slowly out, trickles down the rope and along the coil, and so distributes itself over the whole Gootee.

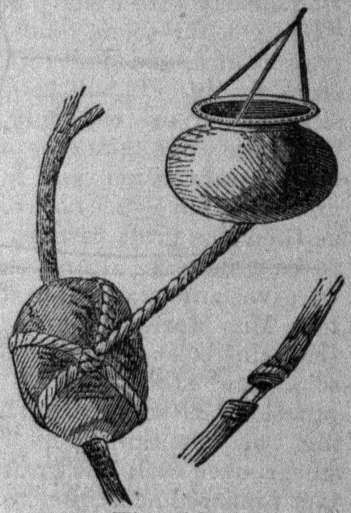

Fig. 33.

The two-halves of pots, above recommended, are now used more largely for Gootee than as here described.

GRAFTING.

Grafting, properly so called, is not practised in this country to any extent. The reason for this is that the operation is not properly understood. The *mâllee* would certainly make short work of it if he had to do the grafting. I have practised this method of propagation with Peaches, Oranges, and Roses, and found it far more successful than I had anticipated.

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* 'Transactions of the Agri-Hort. Society,' Vol. III, p. 2 and Vol. VI. p. 18.

Mr. Charles Maries, the well-known Botanical Collector, and who has been for several years Superintendent of the Maharajah of Durbhunga's beautiful Palace Gardens, tells me that he has found grafting very successful, even with the Mango. The methods practised by him are the following :—

WEDGE-GRAFTING.

For this the scion and stock must be very nearly of the same thickness and age. Select a vigorous stock, and 'head' it to within about 6 or 8 inches of the soil, and prepare it as at *a* in Fig. 34, cutting clearly with a sharp knife. Then get the scion, and prepare as at *b*, and fit it into the stock firmly. It will be quite sufficient if *one* side only fits in square ; but take care *never* to separate scion and stock after they have once been fixed, as then the graft is sure not to be a success. I am unable to give any reason for this, but Mr. Maries assures me that this is so. Having fixed scion and stock, tie up the junction with some cotton basting, or plantain fibre, and smear over with the grafting-wax prepared according to the recipe given further on. If the graft can be kept in a situation not exposed to the sun, so much the better. In about six weeks the graft will be a well-established plant.

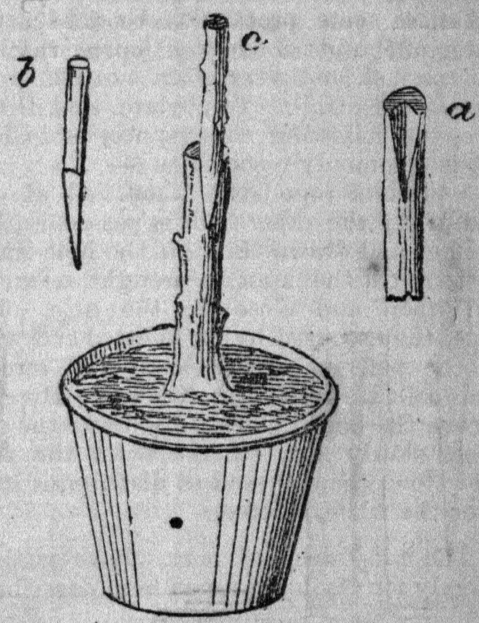

Fig. 34.

SIDE-GRAFTING, OR THE "NURSERYMAN'S GRAFT."

For this, the scion and stock need not be of the same thickness ; indeed, it is essential that the scion be much thinner than the stock. It is not necessary to 'head' down the stock. Having secured a healthy stock, make a clean cut with a sharp knife longitudinally, about half an inch deep ; then from about an inch and a half above the cut, slice away the bark with a portion of the pith, thus leaving a small opening wedge-shaped. The stock is now ready for the scion, which prepare

by flattening at both ends, exactly wedged-shaped, and insert into the tongue-like slit in the stock. Then bind up and the graft is ready, after which bind and paint it over with the grafting-wax. This will be found a very easy and successful method.

CLEFT-GRAFTING.

For this also the scion does not need to be of the same thickness. In fact, the stock must of necessity be two or three times as thick as the scion. Head down the stock to within eight inches of the soil, cutting off and making a perfectly level surface. To make the cleft in the stock, you need a fine-toothed saw. Prepare the stock as at *a* in Fig. 35, and to keep it open, ram in a wooden wedge as at *b*.

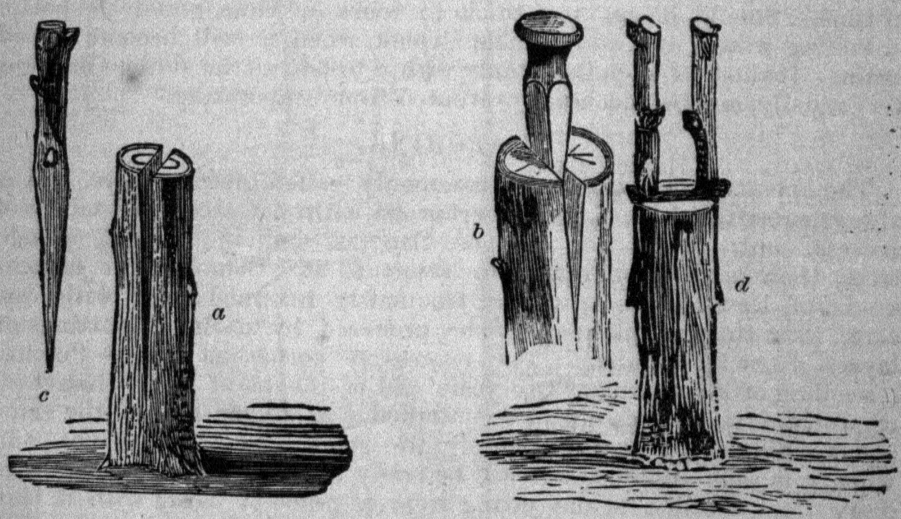

Fig. 35.

Then prepare your scion as at *c*, in the shape of a wedge, and insert it as at *d*. The inner bark of the scion should meet that of the stock. This method is generally adopted when it is desired to utilize an existing plant some years old, which is not considered of value, and upon which it is usual to graft two scions. In binding this graft, it is necessary to wrap it round with wax-cloth first, then

bind with bast, and paint over with the grafting-wax. I have not been very successful with this ; except in the case of Peaches.

GRAFTING-WAX.

The following is considered the best mastic for grafts. I have found it, at any rate, to be the best :—

Common yellow resin	...	...	1 lb.
Beef tallow ...	...	...	1 oz.
Spirts of turpentine...	...	...	1 tablespoonful.
Alcohol (95 per cent.)	...	...	6 oz.

Dissolve the resin gradually over a slow fire, or it will evaporate, and add the tallow, stirring well. Then let it cool a little, and add the spirits of turpentine gradually, stirring all the while. When the mixture has cooled sufficiently to be touched with the fingers, pour in the alcohol. If it is too cool when this is done, it will form a viscid lump, and must be slightly heated again. When nearly quite cool, pour into well-corked bottles, when it will keep for a great length of time. Should it get too thick in course of time, stand the bottle in boiling water, and add a little alcohol, when it will become liquid again. It should be applied thinly with a brush, as the surface hardens very rapidly, and the alcohol is prevented from evaporating.

INARCHING.

The operation of inarching is commonly called grafting here, and is always substituted for it, being performed with far greater certainty of success; but, except for Mangos, Sapotas, and, in Bengal, peach-trees, there is not often need to resort to it. Some of the choicer kinds of Roses, it is true, are frequently inarched ; but with due care, more thriving plants may be procured by means of cuttings or layers, if not by budding. The process is performed thus :—Procure a seedling of about one or two years' old of the plant to be inarched, or, where a seedling is not to be obtained, a rooted cutting of the same age of the plant that is to supply the stock. Put it in a pot, and when it is well established it will be ready to be operated upon. Slice away from one side of the young stem a peace of bark, with a thin layer of the wood beneath it, about two inches long ; do the same to a young stem of the plant to be inarched from, and then bring together the two stems that have thus been operated upon so that the cut parts lie close in contact, face to face, and bandage them with cotton-twist. In course of time, when the parts have united, head down the stock and dissever the scion from the parent plant by cutting it through below the bandage. The grafted plant must then be put somewhere in a shaded place and not removed from its pot till it has made a vigorous growth, and stock and scion have become thoroughly incorporated.

BUDDING.

Sir J. Paxton states that "budded plants are more free in their growth, and no doubt more prolific, than those raised in any other way, although it is several years before they can be brought to a bearing state."* In this country, however, no such objection applies, for here they make most rapid growth and come into bearing quite as soon as those that have been inarched. At Ferozepore a small Mulberry-tree was budded in the month of February, and by October, eight months after, stems had been put forth from the bud stout enough to support a man's weight amongst them. Budded Peach-trees likewise were almost equally vigorous in the growth of weed they made.

Budding upon an emergency may be performed upon any of the shoots of a full-grown plant if all the branches but the budded ones be cut away. But the proper method is to raise seedlings, or in the case of Roses, strike cuttings expressly for the purpose of budding upon. Seedlings of most plants will generally be ready for the purpose in about a twelve month from the time the seed was sown. They will be the better for having been transplanted previous to the operation, either into the spot where they are to remain permanently, or elsewhere; but they must have become thoroughly established before budding upon them be attempted.

In the Upper Provinces the operation of budding is performed with great facility at two seasons of the year—first, when the plants are about to start for their Spring growth, and again when for their Midsummer growth, as at those times the bark separates most freely from the wood. But, for some reason I am unable to explain, I have not found such to be the case in the vicinity of Calcutta; and budding can so seldom be performed there with success, that it is rarely or never attempted, inarching being uniformly adopted instead.

For the operation of budding are required a ball of cotton twist, or strips of plaintain fibre, a sharp penknife (or a pruning knife), and a budding-knife. The last may be easily made of a thin piece of ivory, filed into the form and size of a lancet, and fixed in a wooden handle.

The time when the operation can be performed with success depends on the fit condition of the plant to be used as the stock. This can be at once determined by making a cut through the bark down upon the wood, and trying whether the budding-knife can be thrust freely between the bark and the wood. If the bark adheres firmly, so as only to be raised by tearing away, it is of no use to attempt to bud;

* 'Magazine of Botany,' Vol. IV, p. 61.

but if the bark is found to yield readily, the operation may be safely commenced upon.

Make a gash through the bark across the branch in the place where it is to be budded upon, and from the centre of this gash make another gash, about an inch and a half downwards. (Fig. 36*b*), The bud to be inserted must then be taken off the branch on which it is growing. Select a plump bud, and if, as is commonly the case, it has a leaf growing beneath it, cut the leaf off, leaving about a quarter of an inch of its foot-stalk adhering below the bud. Then pass the penknife into the branch about half an inch above the bud, and slice down a thin piece of the wood with the bark and its bud upon it, bringing the knife out at about two-thirds of an inch below the bud. The bark with the bud upon it is called the shield (Fig. 36*a*). Before inserting it, it is necessary that the wood adhering to it be removed; and to do this without injuring the eye of the bud is a matter of some little nicety. But it may be done without risk of failure by holding the shield in the left hand and thrusting the thumb-nail of the right hand between the wood and bark of the upper part of the shield, and then removing the wood from the bark by pulling it off downwards, carefully keeping the bark all the while quite erect and inflexible (Fig. 36*b*). By adopting this plan a little wood may be left behind, but there is no fear of the eye being damaged.

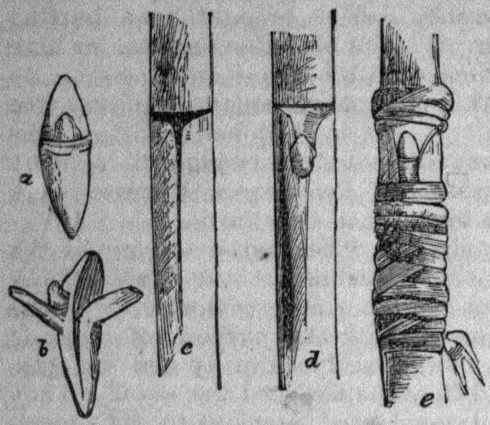

Fig. 36.

In behalf of those who find a difficulty in removing the wood from the shield, it may be well to mention, that, it is by no means essential to do so; that the Americans never do it, and even condemn the practice. They say that the wood assists to keep the bud moist, and prevents its being destroyed by the heat; and that by inserting the bud, just as cut from the shield, the operation of budding is rendered far more easy, more speedy, and proves uniformly more successful.

As soon as posssible after the shield is ready, the longitudinal gash that has been made in the branch must be lifted open with the budding-knife and the shield slipped down so as to lie upon the naked wood of the branch, similarly situated as it was upon the branch from

which it was taken (Fig. 36*d*). Then cut half the part of the shield off that is above the bud with a cross-cut, so that the upper part of the shield may lie close and even against the cross-cut of the branch; then bind the whole round firmly, but not tightly, with the cotton twist, or plantain fibre, leaving the bud exposed (Fig. 36*e*). The first indication of the bud having taken will be the falling-off of the little bit of leaf-stalk that was left adhering to it. When the bud has pushed forth about a quarter of an inch, the cotton binding should be removed; but the branch should not be headed close down till the bud has sent forth a considerable shoot.

For budding Oranges, Dr. Bonavia recommends what he says is the native method, namely, a longitudinal gash only, and no cross-cut, on the stock. He directs that the buds be inserted on the north side of the stock, as being the most shady. "Bend the stock towards you, so that the incision may be at the bottom of the curve. By so doing, the edges of the incision can be lifted from the wood with the greatest ease by means of the point of the knife. When the incision is gaping, introduce the shield. Twist a thin slip of dry Plantain leaf, previously wetted, above and below the bud."*

It has been found that wood containing eyes for budding, if packed carefully in moss, may be sent a journey of many days, and prove as serviceable for the purpose as fresh-cut wood. In this simple way new Roses are now easily procured from the most distant parts of India. Mr. S. Jennings told me that he had had wood sent to him at Allahabad even from England, and succeeded in adding thus several new Roses to his stock.

Budded plants are for some time very liable to have the branches broken clean off at the point where the bud was inserted, by strong winds. To guard against this, stakes should be driven in the ground, to which the branches should be tied.

PRUNING.

FRUIT-TREES.

With the exception of the Peach, the Grape-vine, the Bael, the Fig-tree, the various Plums, and sometimes the Custard Apple, there are no fruit-trees which it is usual to prune in this country. Whether or not several might be benefitted by the operation, if performed with judgment, is a question that remains to be determined.

FLOWERING-SHRUBS.

Nearly all plants of this kind are greatly benefited by being pruned closely in after they have done flowering. They break out again with

* 'Journal of the Agri-Hort. Society,' Vol. XIV, p. 200.

vigour and blossom in a much more compact and handsome form the following season. The appearance of the plants also is vastly improved, as well as their tendency to flower more freely increased by their being kept as much as possible to one stem clean of branches for some little height above the ground.

I may here mention an operation which on some plants seems to have the tendency to cause them to flower, and which probably might be applied with advantage to very many more. The operation is to confine the plant to one stem, by stripping away all the lower shoots and leaves, so as to cause the stem to make all its growth upwards. To give instances: I have mentioned elsewhere how the Heliotrope thus treated comes much earlier into blossom; the Carnation, which is rarely known to bloom in Calcutta, the *mâlee* of the Dalhousie Square Gardens told me he had caused to flower in June by this means; for the same purpose the natives prune away the lower fronds of the Cocoa-nut; thus also the Yucca is hastened into blossom; and it is the practice often recommended to cause Cauliflowers to form heads.

ROOT-PRUNING.

This, as applied to Mangos, Peaches, and Grapevines, is, I believe, a very old practice in India, though the principle upon which it is performed appears to have been but very imperfectly understood.

The mode of proceeding in this country is the very reverse of that practised of late in England. Instead of removing the earth at some distance from the tree and cutting away the ends of the roots there, the practice in India is to open the soil immediately at the base of the stem, clear away some of the small roots, and after a week or two fill in with manure and cover over again with soil. This, though apparently opposed to theory, is, in fact, most efficacious in practice. The trees treated thus bear prodigiously.

Mr. Rivers remarks: "The object constantly had in view is to make fruit-trees healthy and fruitful by keeping their roots near the surface. The root-pruning and biennial removal, so earnestly recommended, are the proper means to bring about these results, as they place the roots within the influence of the sun and air. The ground over the roots of garden-trees, as generally cultivated, is dug once or twice a year, so that every surface-fibre is destroyed and the larger roots driven downwards." This object is completely effected by our Indian practice. On opening, as usual, the soil at the base of the stem each year, the large dense mass of fibrous roots that presents itself is often quite astonishing.

'Miniature Fruit Garden.' p. 4, 10th Ed.

CONVEYANCE.

The importing of plants to this country, or the conveyance of them from any one part of it to another at a considerable distance, is generally attended with some trouble and not a little expense. Where however, the expense is not minded, unquestionably the best of all means of transmitting plants is in what are called Wardian cases.

A Wardian case is simply a strong wooden box, with a high-pitched roof fitted on to it. The roof is glazed with small overlapping panes of glass, accross which rows of stout wires are fastened to protect them from being broken. One of the sides of the roof is made to screw on and off, for putting in or taking out the plants. The bottom of the case is filled with soil, in which the plants to be conveyed are planted very closely together for economy's sake. When they have become pretty well established, they are watered moderately—not excessively: the side of the roof is screwed on, and the case is then ready for transmission.

It was formerly thought that these plant-cases should be hermetically closed; but this of late has been found to be a mistake. The small amount of air that gains access to their interior through accidental crevices is considered rather beneficial than otherwise. The Wardian case recently patented by Mr. W. Bull, the well-known plant merchant of Chelsea, is so constructed that the condensed moisture inside does not fall on to the plants in it. In fact, it is about as perfect a case as could be found, and is now very largely used.

A rough mode of conveying Rose-trees to this country from England, which has been adopted of late years and been attended with partial success, is as follows :—

An order is given to some nurseryman in England to send out a selected number of plants. In November, when they have become dormant, he pulls them up by the roots, without any earth upon them, lays them in a wooden box packing them well in with dried moss, nails the lid of the box on, and so despatches them overland to this country.

The plants, as soon as possible after arrival, should be potted off, and their stems bound round with the moss in which they were packed. They should then be put in some shady place, out of the way of the wind, and be frequently watered all over.

But this withal is a very rude way of proceeding, involving to a certainty the loss of a large proportion. A modification of it for the conveyance of plants of nearly every description, adopted by Mr. M'Ivor at Ootacamund, some years ago, and attended almost uniformly with success, was communicated to me by himself as follows :—

He writes to a nurseryman in England, some considerable time beforehand, what plants he desires to be sent out to him. The nursery

man cultivates specimens in very small pots, from which after a time he removes them, binds the roots, with as little soil upon them as possible, round with moss, and then sets them closely side by side. In this way they will grow vigorously, filling the moss with young roots. On the approach of winter, when they become dormant, watering is discontinued, and they are allowed to become quite dry. This is a point most essential to success. They are then headed down and packed with care closely in a wooden box. Nearly all the beautiful exotic plants with which the public gardens at Ootacamund are enriched were procured from England, Mr. M'Ivor assured me, by adopting this plan.

I question, however, whether any English nurseryman would think it worth his while to take the trouble of carrying it out for a single order from any private individual.

Upon this subject Mr. F. Halsey, of Umritsur, made the following important communication to the Agri-Horticultural Society.*

"I have this year received three cases of plants from England,—one for myself, containing 14 Roses, Camelias, and many other plants, four were all but dead on arrival, and all are looking well now; and two for friends, one containing 40 Roses, and the other about 100, all of which were alive on arrival. With regard to treatment in Europe, the plantsmust be well-established with strong roots, and not despatched before the first week in December. The box in which they are packed should be made of deal, well *screwed* together to prevent ingress of much air; the ends inside, where the roots lie, should be lined with zinc and coated inside with thick felt. Every row of Rose roots should be supported by a small deal batten, nailed to the sides of the box from the outside; the roots to lie in moist pulverised clay mixed with moss.

"On arrival at their destination in India the box should be opened in a dark *moist* room, and each plant be potted; the soil made light about the roots, but *not wetted for the first week.* Two or three times a day the top and stems should be syringed freely, but to avoid the water getting to the roots, the pots had better be laid on their sides, and the moister the atmosphere around them is kept the better. After the first week they may be removed from the dark room and a little water may be given them, until the plants show symptoms of growing. When once the plants commence growing, cut them back to four eyes of stem. But the plants must be kept in a moist place and syringed until they have quite got over their journey. The most important things to remember in this country are, to give no water for the first week, and not to allow the sun's rays to fall directly upon the plants until fully established."

These directions, Mr. Halsey says, were originally given him by Messrs. Barr and Sugden, of London. They are precisely the same as

* March 16, 1870.

Mr. S. Jennings, in a subsequent communication, states he received from the same quarter.

The clay and the zinc, it is obvious, must add considerably to the weight of the box, and consequently much to the expense of the carriage; but far better this than incur the loss of so large a proportion as otherwise is all but sure to happen. The additional expense, moreover, would not amount to anything like the value of the plants that without it would be lost.

Mr. R. Lindsay, Curator of the Royal Botanic Garden, Edinburgh, in a communication to the *Edinburgh Botanical Magazine*, mentions another most successful mode of transporting plants. This is merely to use the ordinary Wardian case, but instead of glazed sashes to use cotton cloth blinds, which are nailed to the top of the ridge and tied down with cords to the sides of the case, so that they may be rolled up or down as required. "The advantage of this method is the admission of sufficient light and air to maintain the plants in a healthy condition; the fine meshes of the cloth act as a shade from strong sunshine, and do not admit so much air as to cause the interior to become quickly dried up." It was first used by Baron Von Müeller of Melbourne, and proved very successful, almost every plant in a consignment sent in this way arriving in England in perfection after having been three months on the journey.

The native dealers keep their plants often a long time out of the ground, conveying them about for sale sometimes for a period of two or three months. To do this they knead up round their roots the clayey kind of earth in which they grow them to a small compact ball.

Fruit-trees and large shrubs may be dug up in the cold season and conveyed in native-carts to a great distance, without suffering much injury, if they be occasionally watered during the journey. In this way very many plants are annually sent forth from the Saharunpore Botanical Gardens to different parts of the North-West Provinces.

When plants have become to a certain extent dried up from the length of time they have been out of ground during their conveyance, it has been recommended as an excellent plan to steep their roots before planting them in a mixture of cow-dung and water of the consistency of gruel.

M. Ysabeau says, what might be readily taken for granted, that shrubs, such as young Rose-trees, that have suffered from a similar cause, do well by having their stems and principal branches plastered over with a mixture of clay and cow-dung. This serves to keep them moist and protect them from the air. The plaster will fall off of itself in due time, when the young trees have become established.*

* 'Le Jardinier de tout le Monde,' p. 264.

But while upon the subject of conveyance, I must not omit to mention how successful has proved the transmission by sample-post of cuttings carefully packed in moss. Of fifty sent from Calcutta to Indore, some, the recipient stated, had even begun to form a callus by the time they arrived. Mr. S. Jennings, of Allahabad, likewise stated* that he had received fifteen cuttings thus sent, viz., seven Crotons, five Dracœnas, and three Ixoras, "nearly the whole fresh and green." The Agri-Horticultural Society accordingly now present a list of plants that may be thus propagated, and of which they undertake to send cuttings to members who apply for them. The mode of treating these cuttings, when received, will be much the same as that given for cuttings in general, at p. 79.

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* December 15, 1871.

CHAPTER IV.

CALENDAR OF OPERATIONS FOR THE PLAINS.

January.

VEGETABLES.

FROM this month forward vegetables of every kind will need to be constantly watered, and if once or twice a week with liquid manure, all the better.

Water Squashes every day copiously.

Make sowings of Radishes, Mustard, Cress, Spinach, and Lettuce for a succession. In the Upper Provinces Peas may also be sown during this month; but not in Bengal. Sowings of Celery may now be made for young plants to preserve through till the following cold season, if thought worth the while.

Put out young plants of Cabbage and Knol-Kohl to fill up vacant places in beds. Put out young Celery plants for succession.

Celry will now be in a condition fit for earthing up to blanch.

Keep a few plants of Lettuce, Mustard, and Cress for seed. Reserve one or two of the earliest formed heads of Artichoke for seed in Bengal : it is not necessary to do so in Upper India.

The plants should now be taken up for the manufacture of Tapioca and Arrowroot.

FRUITS.

Strawberries will now be blossoming and fruiting, and will require to be well watered : and nets or other means provided to protect them from birds.—

Water Loquats copiously.

Fig-Trees, Peaches, Plums, and Grape-vines should now be pruned.

ORNAMENTAL PLANTS.

Commence giving surface-dressings of fresh cow-manure to Roses.

Chrysanthemums will have done flowering, and should be taken out of their pots, pulled to pieces, and put out in a nursery-bed for a supply of new plants.

The following plants will be much benefited by being well pruned in at this season :—

Allamandas.	Ixoras.	Malvavicus arboreus.
Bignonias.	Jasminums.	Mussœndas.
Hamelias.	Jatropha pandurœfolia.	Nyctanthes.
Hibiscus mutabilis.	Lagerstromias.	Quisqualis.
——rosa sinensis.	Lantanas.	Tecomas.
——Syriacus.		

BOARD OF SECRETARIAT LIBRARY.

February.

VEGETABLES.

Little can be done during this month in the cultivation of European vegetables, except copiously watering those that are already in the ground.

Sowings of Lettuce, Mustard, and Cress may still be made.

To Peas that are reserved for seed, less and less water, if any, should be given as they ripen.

FRUITS.

Water Loquats liberally, as well as Peach, Plum, Lichee, and Mango trees, as soon as the fruit is set.

Earth up and water Pine-Applies.

Fertilise Vanilla flowers.

Sow seed of Water-Melon.

ORNAMENTAL PLANTS.

This is the best season for transferring such Orchids as require it to new pots or baskets.

Hoyas will be started into growth, and should either have the soil in the old pots partially changed, or be potted afresh; they will now bear dividing so as to make several plants out of one.

Re-pot or re-plant Caladiums, Arum pictum, Manettia cordifolia, Cyrtopera flava, Hibiscus Jerroldianus, Gloriosa superba, and all such-like plants, that have been lying dormant during the Cold-season, as well as the several species of Crinum, Globba, Pancratium, Alpinia, Hedychium, Hippeastrum, and Kæmpferia.

Put in the border Petunias, Phloxes, Salpiglossis.

Sow seeds of Poinciana, Tecoma, &c.

Pot off the choice kinds of Roses raised from cuttings laid down in November, and keep them in the shade, well watered.

Roses now may be layered with success.

March.

VEGETABLES.

About the middle of this month remove the soil from the stools of Asparagus and cover them over again immediately with fresh soil, well enriched with old manure, and commence watering copiously.

Take up Carrots and Beet, and store them in pots of dry earth for future use.

Take up and store Onions.

At the beginning of this month, in the Upper Provinces, seeds of American Squash should be sown.

The stumps of Cabbages that have been cut should be allowed to remain and be watered, as by their sprouts they will afford nice gatherings for the table for some time to come.

Dry the leaves of English Sage and Thyme, and store in bottles.

Make sowings of Parsley in a shady place.

FRUITS.

Lichees will be ripening; cover the trees betimes with nets, to save the fruit from birds.

Well water Peach, Plum, and Mango trees, and Grape-Vines. Fertilise Vanilla flowers.

Cut back closely all wood, of last year's growth, of Bâel trees.

This is the season, both in Bengal and Upper India, for sowing the seeds of fine kinds of Melons.

Thin out Plantains, remove the soil from the roots, fill in with fresh cow-manure, and water liberally.

ORNAMENTAL PLANTS.

Withhold water from Dahlias, and when the stems have died down, take up the tubers and store them in pots of earth or sand in a dry godown.

Treat in the same way the several species of Oxalis.

Withhold water from Gloxinia maculata, Lilium longifolium, and Richardia Ethiopica and when the stems and leaves have died down, remove the pots, with the bulbs within them undisturbed, to some dry godown, till the time of re-potting in the following October. Other bulbous and tuberous-rooted plants of a similar description should, of course, receive similar treatment.

Cut well back the wood of last season's growth of shrubs, such as Poinsettia, Holmskioldia, Hamiltonia, Phlogacanthus, Aphelandra, Buddlea, Thunbergia and Cassia alata, that have lately finished flowering.

Euphorbia Jacquiniflora should be treated in a similar way, and the cuttings inserted in pots of sand kept in a sheltered place and well watered: they will afford a nice stock of new plants.

Take up the choicer kinds of Verbena to pot, and keep under shelter during the rains.

April.

VEGETABLES.

Little can be done now in the cultivation of vegetables.

Well water Asparagus.

Gather seed of Onion and Salsify.

Put Yams in the ground, and construct trellis-work for them to trail upon.

FRUITS.

Water Melons unremittingly.

Keep Strawberry-plants watered while the Hot-season lasts.

ORNAMENTAL PLANTS.

The leaves of Gladiolus and some other bulbous plants will be dying down. The pots containing them should be removed to some dry place, where they may remain till the time for re-potting comes round again.

Achimenes, which at this time will be starting into growth, should be potted and well watered as soon as they appear above ground.

May.

VEGETABLES.

Asparagus will now be in season, and the beds must be kept most plentifully watered.

Lettuce may be raised in a shady place from acclimated seed. Beyond this there is nothing that can be done as regards European vegetables.

At the close of the month is the proper time for sowing most native vegetables; the several kinds of country Beans, Cucumbers, and other Gourds; of Maize, Ochro, Brinjals, &c.

This is the period likewise for planting Ginger, Arrowroot, Jerusalem Artichoke, Kuchoo or Ghoyan, Sweet Potatoes, and the Tapioca plant.

FRUITS.

Continue to water Pine-Apples.

This is the proper season for inarching and making gootees or layers of all the different kinds of fruit trees.

ORNAMENTAL PLANTS.

There is little to be done in this department besides watering abundantly young and choice plants.

June.

VEGETABLES.

Maize and the ordinary country vegetables may still be sown. There is nothing that can be done as regards European vegetables.

FRUITS.

Seeds of Mango should now be sown for a supply of stocks for inarching upon.

The operations of gootee, layering, and inarching may still be carried on, and cuttings laid down to strike.

ORNAMENTAL PLANTS.

The slips of Chrysanthemum laid down in January will now have become large plants. They should be taken up from the nursery-bed and pulled apart, and each rooted slip be potted in a single pot, and those of the choicer kinds put under shelter before the heavy Rains set in.

For potted plants, which are to be left exposed to the weather during the rains, bricks should be laid whereon the pots may rest, out of access from worms.

At the end of this month cuttings of most tropical plants may be put down for striking.

As soon as the rains have set in, examination should be made to ascertain where plants are liable to suffer from the lodgment of water around them, and the speediest means that can be devised be taken for draining it off.

July.

VEGETABLES.

During this month sowings of most native vegetables, such as Brinjals, Ochro, Pulwuls, Cucumbers, and the different kinds of runner Beans and Gourds may be continued.

Arrowroot, Ginger, Turmeric, and Jerusalem Artichokes about this time will require earthing up.

FRUITS.

The crowns of Pine-Apples of a fine kind, when wrenched off, should not be thrown away, but inserted in pots of sand under shelter. If watered regularly, they will soon form beautiful healthy plants.

This is the best time for budding Peaches, Plums, and trees of the Orange and Lemon tribe in Bengal (Lower).

Sow Indian Sorrel and Cape Gooseberry.

ORNAMENTAL PLANTS.

At this season sow seeds of

Amaranthus.	Datura.	
Balsam.	Ipomœ rubro-cærulea.	Quamoclic.
Colonyction.	Martynia diandra.	Sesaamum.
Carthamus.	Nicandra physaloides.	Spilanthes oleracea.
Cockscomb.	Nicotiana.	Sunflowers.
Dahlia.	Pentaptes phœnicea.	Zinia.

On examining Dahlia tubers that have been stored away in pots of earth or sand, it will very likely be found that they have begun to make shoots; if so, they should be potted immediately.

Gloxinia maculata will now require to be repotted.

The budding of Roses in Lower Bengal might now be attempted.

This is the most successful season for striking cuttings of all soft and hard-wooded tropical plants which can be propagated in that way, such as Coleus, Dieffenbachias, Hibiscus, &c.

Cuttings also of Rose Edouard, Devoniensis, and the China Roses will strike at this period.

August.

VEGETABLES.

SOWINGS of Celery should now be made in pots, under shelter from the rains. The seed will be slow in germinating; but it is important that plants should be brought as forward as possible for planting out when the rains are over in October.

At this time also Asparagus-seed should be sown, for a supply of plants to make new beds with in October if needed.

Sow the small kind of Tomato.

FRUITS.

It will be found that Peaches, Plums, and the Orange and Lemon tribe may now be budded successfully in Lower Bengal.

Cuttings also of the Orange tribe now laid down will strike readily.

The fruit of Guavas, Custard-Apples, and Pomegranates should be tied up in fine muslin, to protect them from the attacks of birds and vermin.

Now is the season for planting out suckers or offsets of Pine-Apples.

ORNAMENTAL PLANTS.

Roses may be budded during this month also in Lower Bengal.

Stephanotis floribunda and many of the choicest tropical plants may now be propagated by cuttings in sand under glass.

September.

VEGETABLES.

MAKE sowings of Patna Pea.

Commence sowings of Cauliflower, Cabbage, Knol-Kohl, and Artichoke in pots under shelter, or on a raised piece of ground under a hoogla, in order to have plants well forward for putting out in the open ground as soon as the rains are over.

FRUITS.

Peach-Stones sown now will come up in February, and afford stocks for budding upon in August.

Prune away the lowermost leaves of Cocoa-nut trees.

ORNAMENTAL PLANTS.

Sowings of German Aster, Heartsease, and Cineraria should be made this month, as these plants take a long time to mature for blossoming favourably.

At the beginning of this month sow Balsams in Lower Bengal.

Richardia Ethiopica and the several species of Oxalis will now be moving. They should be potted and brought to the light immediately they appear above ground.

October.

VEGETABLES.

As soon as the rains are well over, no time should be lost in preparing the ground and making sowings of Turnips, Carrots, Peas, Beans,

French Beans, Lettuce, Tomato, Spinach, Endive, Salsify, Mustard, Cress, Radishes, Beet, Onions, and Leeks.

Sow in Bengal English Cucumber-seed and American Squash.

Put out in their places in the open ground young plants of Cauliflower, Cabbage, Knol-Khol, Artichoke, and Asparagus.

FRUITS.

Now is the season for making up Strawberry-beds and putting in the plants.

In the Upper Provinces gather Putwa before it is injured by the cold.

Sow seeds of—

Almonds.	Guava.	Plums.
Avocado Pear.	Hog-Plum.	Pumelo.
Bencoolen Nut.	Khirnee.	Strawberry.
Cowa-Mangosteen.	Lichee.	Wampee.
Custard Apple.	Peaches.	

ORNAMENTAL PLANTS.

About the middle of this month is the time for making sowings of all the English Annuals, either in pots or on a raised border under a hoogla.

Pots containing bulbs of Lilium longifolium should be well soaked with water; and about twelve hours afterwards, the soil being thus rendered perfectly loose, the bulbs should be carefully taken out and repotted.

This is the best month to commence the general pruning of Roses in Upper India.

This is the best time for imported bulbs to arrive for potting, such as Hyacinths, Anemone, Ranunculus, and the several kinds of Narcissus, Iris, Ixia, &c.

Repot—

Aloysia citriodora.	Geraniums.	Lophospermum.
Antirrhinums.	Geum.	Pinks.
Carnations.	Habrothamnus.	Plumbago rosea.
Centradenia.	Heliotrope.	Scabious.
Columbine.	Hydrangea.	Sweetwilliam.
Pansies.	Iris.	Verbenas.
Franciscea.	Linum.	Violet.

In Upper India repair the paths.

November.

VEGETABLES.

MAKE successive sowings of Peas, French Beans, Turnips, Carrots Radishes, Lettuce, Beet, Mustard, and Cress.

Thin out betimes Turnips, Carrots, and Beet.

Make successive plantings of Cauliflowers, Cabbages, Knol-Kohl, Lettuce, and Celery.

Stick Peas before they begin to fall about.

Earth up Potatoes.

Yams are now fit to be taken up for use.

Plant out Onion-Bulbs for obtaining a crop of seed from in April.

Take up Mint and plant it in a fresh soil, well enriched.

FRUITS.

By the end of this month it is well to lay open the roots of Mangos, and also of Peaches, Plums, and Grape-Vines and to withhold water entirely, in order to accelerate the fall of the leaf and the ripening of the bearing wood.

ORNAMENTAL PLANTS.

This is the best season for putting down cuttings of all kinds of Roses, and indeed of most exotics natives of a colder climate.

The several species of Canna may now be dug up, parted, and planted in fresh ground.

December.

VEGETABLES.

MAKE sowings of Radishes, Mustard Cress, Lettuce, Peas, and French Beans for succession.

Put out fresh plants of Knol-Kohl, Cabbage, Cauliflower, and Celery.

The most advanced crops of Celery will be now in a condition for earthing up to blanch previous to use.

Water well Celery, Squashes, Radishes, and Asparagus seedlings.

Withhold water from old Asparagus plants, that they may die down and go to rest.

FRUITS.

Gather Roselle.

Well Water Cape Gooseberries. In the North-West Provinces the plants should be covered in at night during the Cold months, or they will be much injured by the cold, and the fruit will not ripen.

Place seeding Bilimbis in a warm, sheltered place during the cold months.

Prune Fig-Trees, and Grape-Vines.

Towards the close of the month cover again the roots of fruit-trees that had been exposed with fresh, well-enriched soil.

ORNAMENTAL PLANTS.

Put down cuttings of Aloysia citriodora, Heliotrope, Geranium, Pinks, Carnations, Habrothamnus, Verbenas.

Allow to dry down Arum Pictum, Gesnera tubiflora, Sprekelia, the varieties of Caladium, and such like potted bulbous plants.

In the North-West Provinces cover over at night, to protect from frost, young Heliotropes, Tropœolum, Canary Greeper, and seedling Menhdee plants.

Keep under the shelter of a warm verandah Ixora Javanica, Hoyas, and Vanilla plants that are in pots.

Make successive sowings of such quick-growing things as Browallia, Linaria, Cuphea Mignonette, French Marigold, and Convolvulus Major.

German Asters, Cinerarias, and Pansies will require re-potting in a richer soil.

CALENDAR OF OPERATIONS FOR THE HILLS.

January.

VEGETABLES.

THERE is little that can be done in this month. As a rule the ground is covered with snow, and very few of the ordinary vegetables survive the effects of the 'white mantle.' The work, therefore, in the vegetable garden is at a standstill.

FRUITS.

The same may be said of the fruit garden. I am not aware that fruits are grown under glass on any of the Hill-stations; but even if they were, all that can be done is to maintain an equable temperature in the house, ranging between 50° and 60° Fahr.

FLOWERS.

In the flower garden out of doors, the ground being covered with snow, it is impossible to do anything. It is assumed that such plants as need the protection of the stove or green-house have been sheltered therein. Others that are left out of doors, such as Roses, &c., should be looked at occasionally to see that they are properly sheltered.

Care must be taken not to allow the temperature in the stove to go below 50° Fahr. at night. About this time a careful search should be made for insect pests, which should be destroyed, or they will begin their depredations on the first approach of Spring.

February.

VEGETABLES.

DURING this month the heaviest falls of snow occur generally; but this should not deter the careful gardener from making preparations for the sowing of early vegetables in pots, pans, boxes, and glazed frames having bottom-heat. By bottom-heat I mean a hot bed, into which the pots and pans must be plunged up to the rim. Seeds of Carrots, Turnips, Lettuce, Cabbage, Cauliflower, Spinach, Endive, Asparagus, Radish, and Cress should be sown. If there are no frames, then the pots, pans, and boxes must be kept in the green-house or stove.

FRUITS.

About the end of this month, the fruit trees will begin to show signs of reviving life. The roots should be cleared of all rubbish, and preparations made to open the soil round them. This should not, however, be done unless there is a prospect of the snowfall ceasing. If the season promises to be an early one, Apple, Pear, Apricot, and Plum trees should be pruned about the end of this month and manured. Strawberry-beds should now be prepared and the suckers transplanted.

FLOWERS.

In the flower garden the busy time will begin about the end of this month. Sowings of English annuals should now be made in pots and pans, especially Calceolaria, Cineraria, Heartsease, Aster, and Larkspur, as these take longer to develop than others. If it has ceased snowing, Roses, Geraniums and Fuchsias should be pruned, and the cuttings put down in sand in the propagating frame. This is the best time to repot Geraniums and Fuchsias, and Roses in pots. The beds and borders out of doors should now be looked to, and cleared of all rubbish, and the soil dug up and got ready for planting.

March.

VEGETABLES.

THIS is a very busy month for the gardener on the hills. The vegetables sown last month should be put out in the open about the middle of this month. Make successive sowings of the same, and

first sowings of Peas, Beans, Tomato, Salisfy, Mustard, Beet, Onions, Cucumber, and Knol-Khol, either in prepared sheltered beds, or in pots, pans, and boxes.

FRUITS.

Fruit trees should now be pruned and manured. The treatment for each will be found in its proper place. It may be mentioned in a general way that whatever treatment fruit trees receive now, will shew itself in the fruit hereafter.

FLOWERS.

About this time the stove and green-house should be thoroughly overhauled. Cuttings of Geraniums, Fuchsias, Roses, Hydrangeas, Bigonias, &c., should be put down, and a good stock of plants will be the result. Bulbs of Hyacinths, Narcissus, Gladiolus, Tulips, Ranunculus, Anemones, Spiræas, Ixias, Sparaxis, and the different varieties of Lilium, should be put down in pots, or in well prepared borders.

An occasional application of liquid manure now will have a wonderful effect on Roses. Geraniums and Fuchsias will also be greatly benefited by an occasional supply.

Seedlings of annuals will be requiring their second shift about the end of this month. Cinerarias, Calceolarias, and Heartsease will be sufficiently developed to be moved into their permanent quarters. They should have plenty of light (sun-light) and air. The best place for them is under a cloth awning. They should be liberally watered, and once a week with a weak solution of liquid manure. These annuals make a grand show if well cared for now.

Ferns should be carefully examined, and those requiring it, should be re-potted. Many of the soft-wooded plants under glass will also requiring re-potting at this season.

Perennial Phloxes, Carnations, Picotees, and Hydrangeas should now be looked to. Give them fresh soil, remove all old and dead branches, and put down cuttings.

The nights and mornings are yet very cold, and care should be taken not to allow the temperature in the stove and green-house to go down too low.

April.

VEGETABLES.

THIS is also a busy month. Successive sowings should be made of the vegetables sown last month. Water the transplanted seedlings copiously.

FRUITS.

Strawberries will now be ripening, and should be watered copiously, or the fruit will be small, and wanting in taste. Water other fruit trees also sufficiently.

FLOWERS.

Roses, Geraniums, and Fuchsias will now be making rapid growth, and should be kept well supplied with water. An occasional application of liquid manure will have a good effect, especially on Roses in pots and tubs. Dahlia bulbs should now be looked to. They should be carefully turned out of their old pots, and planted in fresh, rich soil—the richer the better. Tubers of Caladiums, Alocasias, Gesneras, and Gloxinias, should now be planted in pots, together with tuberous rooted Begonias. Cuttings of Roses, Geraniums, Fuchsias, Begonias, &c., if put down now will strike very readily.

May.

VEGETABLES.

THERE is nothing particular to be done in this month in the way of vegetables, except to make successive sowings, and water copiously all such as have been transplanted. This is generally a very dry month, and unless water is abundant, there is a chance of the vegetables, especially roots, not swelling and fully developing. Sowings of American Maize may now be made.

FRUITS.

Apples, Pears, Apricots, and Cherries will now be developing. Measures should be taken to protect the fruits from the depredations of birds and flying squirrels. If water in sufficient quantity is available, it should be well supplied.

FLOWERS.

The syringe should be frequently used in the stove and green-house now. Most of the annuals will now be coming into flower. Cinerarias, Pansies, Calceolarias and Mimulus will require frequent waterings. So will Roses, Geraniums, and Fuchsias. Hydrangeas will now be looking up, and any attention now given them, in the way of liquid manure, and loosening the soil round the roots, will produce good effects. They will make a grand show next month.

June.

VEGETABLES.

SUCCESSION sowings may now also be made. Most of the vegetables will now be ready for use. Celery should be earthed up now for bleeching.

FRUITS.

There is not much to be done this month, except to water the trees freely. This is the best month for grafting.

FLOWERS.

Roses will now be in full bloom, as well as Fuchsias, Geraniums, Hydrangeas and most of the annuals. They should be well supplied with water. Begonias will now be in full display. Cuttings of most of the flowering perennials put down now will make good plants. The syringe should be freely used, both for in and out-door plants. Ferns will require to be kept moist this month.

July.

VEGETABLES.

THE rains will have set in now, and any seeds sown during this and the two following months, must be kept under shelter to protect them from the heavy rain. Succession sowings of most vegetables may be made.

FRUITS.

Apples, Pears and Apricots will now be ripening, and should be protected against depredations of all sorts. At the end of this month sow seeds of the hill Apricots for a stock of plants to graft some of the superior English varieties upon.

FLOWERS.

Dahlias will now be flowering, and occasional applications of liquid manure will have a very good effect upon them and Hydrangeas. Hanging baskets filled now with wild ferns, and other cultivated varieties of Adiantums, Davallias, Nephrolepis Duffii, &c., with a Begonia in the centre, will have a very fine effect in the stove and green-house. Fuchsias will now be making rapid growth. The cuttings put down in April and May will now be well-established plants, and should be potted off in three and four-inch pots in good rich soil, and plenty of drainage. Cuttings of Begonias, Dieffenbachias, Anthuriums, Dracœnas, Crotons, &c., should now be put down, together with Geraniums, Fuchsias and Hydrangeas. The stove and green-

house must be examined every day for insect pests. The temperature within should be kept as equable as possible.

August.

VEGETABLES.

DURING this month there is generally either very heavy rain, or a long break, and there is not much to be done in the way of sowings out of doors. The most important operation now is to see that the heavy rain does not wash away any young seedlings put out last month.

FRUITS.

Apples, Pears and Apricots will now be fit to pluck. The trees generally become very much exhausted, and the sooner the fruit is removed, the better for the trees. Grafting may be done in this month, as well as budding of Peaches.

FLOWERS.

Cuttings of Begonias, Geraniums, Fuchsias, &c., may still be put down in sand in the hot house. Hydrangea cuttings put down now will form fine plants by the end of March. Fuchsias make a great deal of growth this month, and should be kept properly staked. Dahlias will also require staking. A strict supervision should be kept over the frames and houses, as it is at this time that a lot of mischief is done by plant pests. Roses may be budded during this month, and cuttings of China, Tea and Bourbon varieties put down in glazed frames.

September.

VEGETABLES.

ABOUT the beginning of this month seeds of Carrots, Cabbage and Cauliflower may be sown under shelter for the late autumn supply; other seeds might also be sown if there is room available for them. About this time suitable plants should be selected for seed.

FRUITS.

Some of the later varieties of Apples, Pears, and Plums ripen in this month, and will require to be protected from the depredations of birds. After the fruit is removed, all dead and decayed wood should be cut away; the old wood, and such as has done bearing, should be cut back, and the trees trimmed to the shape it is intended they should take. As a rule this work is sadly neglected in hill gardens, and the

result is trees of straggling growth, and overcrowded with unnecessary wood, to the great detriment of the fruit bearing wood, which gets no chance to develop. Seeds of Apples, Apricots, and Pears may be sown now, if it is desired to raise seedlings.

FLOWERS.

Dahlias will now be finishing their blooming, and steps should be taken to put down tallies in the spot where the roots are intended to remain for the winter, so as to identify them next year. Withered flower-heads should be removed, unless it is intended to gather seed. The better plan is to take up all the tubers after the plants have finished their growth, and to store them away in dry sand or saw-dust. Most of the annuals will now have finished their flowering season, and arrangements should be made to gather seed. Perennial Phloxes should be put under shelter at the end of the month. Cuttings of Geraniums, Picotees and Carnation, can now be put down with much advantage.

October.

VEGETABLES.

CELERY beds should be supplied with fresh manure now. Artichoke seeds may now be gathered, and the plants cut back, the roots being supplied with fresh soil. Sowings for the winter supply should now be made in frames, of Lettuce, Cress, Raddish, &c.

FRUITS.

All fruit trees will now be entering that stage in which they will require rest. Water should be withheld, except occasionally. Opportunity should now be taken, at the end of this month, of giving them a general pruning. This operation is very much neglected on the hills. Those trees that have not fruited during the season, should now be root-pruned.

FLOWERS.

Most plants will now be entering the rest stage, and water should be sparingly given to such plants as Ferns, Gloxinias, Gesneras, Dieffenbachias, &c., which should be allowed to die down gradually. Tuberous-rooted plants generally should get no water, and as soon as the soil is quite dry, and the stems have died down, the tubers should be taken up and carefully stored away in dry sand or saw-dust. The temperature in the stove must be increased, especially at night. Seeds of annuals should be gathered, and the beds and borders cleared of the dead plants, which might be done by digging them into the soil.

November.

VEGETABLES.

DURING this month there is not much to be done in the way of sowing. Seedlings of last month's sowing should be put out under shelter. This is the best month for gathering seeds of most vegetables which have finished their growth.

FRUITS.

There is nothing to be done this month out of doors. It is not, I believe, usual to cultivate fruit trees under glass on the hills yet. Young plants might be protected from the frost, which begins this month.

FLOWERS.

The principal operation this month is to protect such of the outdoor plants as need protection from the cold. Sometimes it snows during this month, with heavy rain and sleet. In the houses the temperature must be raised and steadily maintained during the night, or the result will be fatal to many rare, beautiful and tender plants. Ferns and orchids in particular will suffer severely if the temperature is allowed to go down below 60°. All plants will need less water, many none at all; but in this the gardener must be guided by experience and local requirements.

December.

VEGETABLES.

THERE is scarcely anything to be done this month, and the remarks for last month will apply equally for this one. If it is thought worth while, some of the later seedlings from October might be kept in frames with a hot-bed; but, as a rule, English vegetables are in full season on the plains during this and the next two months, and residents on the hills obtain their supplies from this source during the winter.

FRUITS.

There is nothing to be done during this month out of doors. Most of the fruit trees will have shed their leaves, and will soon be putting on their winter mantle of snow.

FLOWERS.

The remarks for last month will apply equally for this. Water should be entirely withheld from all plants except those that flower during the winter, and these should be sparingly supplied—just enough to keep them alive.

PART II.

THE VEGETABLE GARDEN.

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THE VEGETABLE GARDEN.

CULINARY VEGETABLES.

Among the vegetables, the cultivation of which I have here described, will be found many of the native ones of the country which are served at the tables of Europeans. It is not often that these prove acceptable, where European vegetables can be obtained, though welcome as substitutes where they cannot. A description of all the plants eaten as vegetables by the natives, would comprise nearly the whole of the weeds, except those that are absolutely poisonous, that are to be met with in the country. In fact, it can hardly be correct to regard many of the plants eaten by the poorer classes as potherbs at all, being employed in their cookery merely as a vehicle for their curry ingredients.

PRELIMINARY.

For vegetables, the seed of which is to be sown broadcast, the mode of laying out the ground usually adopted by the mâlees is perhaps the best; which is, to part it off into plots or beds four feet wide. Between each bed an embankment is raised, about two inches high and a foot wide, of earth well beaten down and flattened. This is for a path to give the mâlee access to the vegetables for weeding and watering them. Care should be taken in forming the embankments to use a line and measure, so as to preserve perfect symmetry, otherwise the ground will look unsightly. By scrupulous neatness and regularity in the work a piece of vegetable ground may be made to look as agreeable as a flower parterre.

It is stating no more than an axiom in gardening to say that the earth in the beds, immediately previous to using, should be well dug and thoroughly broken up and enriched with an abundance of manure. Before sowing of the seed the surface of the soil must be made very fine, and as free from lumps as possible. It will be vastly improved by a coating of leafmould, spread perfectly level over it, for the seeds to germinate in.

If the soil is dry and dusty, it is in a most unsuitable state for sowing, though indolent mâlees, if not looked after, will often sow seed in it in that condition. It should be quite moist and mellow, and if found not to be so when required, should be made so by copious watering a day or so before the sowing is made.

Either one of two modes of sowing may be adopted—broadcast or in drills. Each has its merits, but the former is the one almost invariably practised by mâlees.

In using the broadcast method, an admirable plan is to mix the seed well with about three times its bulk of dry silversand. By this means it may be insured that the seed be scattered evenly over the whole bed, not more in one place than in another.

It has been recommended to stretch a white cloth over the ground where the seed is sown, until it germinates: and no doubt this would have the good effect of preventing the heat of the sun from drying up the moisture from the soil too quickly.

The mode of laying out the ground for the cultivation of Peas, Beans, Celery, Cauliflowers, and Cabbage will be given in the places where those vegetables are severally treated of.

AGARICACEÆ.

Agaricus.

MUSHROOM.

Mushrooms are produced spontaneously and in great abundance in many parts of Bengal, and may be had merely for the trouble of gathering, but the edible ones are so exceedingly difficult to distinguish from others that are poisonous, that it would be better, unless absolutely certain of the right ones, to abstain from them altogether.

The following mode of producing them by cultivation has been communicated by Mr. D. B. Lindsay:—

"On the floor of an unoccupied bungalow, I laid a layer of broken bricks, about three inches thick, and covering a space about fifteen feet in length, by about three in breadth. Upon the top of the bricks I built up a bed of three layers of unbroken horse-droppings, about three inches thick, and three layers of good mould, also about three inches thick; say, first, a layer of horse-droppings, and then a layer of mould, and so on. The droppings should be partially dried, and well beaten down before being covered with the mould. Water the bed occasionally,

and in two or three months I will guarantee a crop of Mushrooms. Two descriptions of Mushrooms have grown, one with a brownish top, and the other, which is much the finest and largest of the two, with a pure white top. The gills of both are a light pink salmon colour when fresh."*

The character of the Common Mushroom of India Mr. R. J. Pannell gives as follows :—"The wholesome Mushroom is firm and solid to the touch. When they first break through the soil they are closed, and in shape somewhat like a page's jacket button; when a day or two old they open out like an umbrella, and the gills or under-side are found to be of a delicate pink colour, which changes as the Mushroom gets older to a reddish-brown, and before it seeds gets almost black. The upper side is covered with a whitish skin, that may be readily peeled off from the edge to the centre of the top, and resembles in texture thin white kid. No Mushroom should be eaten that has not a rich and delicate smell, even though it may otherwise agree with the above description. There are other kinds also that resemble the common edible one in point of colour of gill, &c., but these, instead of having a firm, have a week stem and a slimy skin, and if cooked by mistake may be known at once, as they turn to a bright yellow colour, and should be avoided."

He further states that there is no need of a building to grow Mushrooms in, and that he has raised considerable numbers in different parts of the country in the open air. He says, however, that it is necessary to protect the beds in which they are grown from excessive wet. His plan in essentials is much the same as Mr. Lindsay's. He makes his bed of a layer a foot thick of horse-droppings, that have been allowed to stand till their first fermentation is over; above this he spreads alternately rather thin layers of loam, and a compound of horse, cow, and sheep-dung, old lime or mortar and Deodar sawdust, the uppermost layer being of loam. He beats or treads down the whole firmly; covers the bed during the day and in wet weather, and leaves it open on fine nights. In about two months the bed, he says, will be found to be a mass of spawn, and a few weak or spurious Mushrooms will sprout up, at which time give a gentle watering every morning, and leave it open during fine weather. In a few days good Mushrooms will appear. "When you collect the crop," he adds, "do not disturb the root, but cut off the top carefully; as at the root of each will be found a few young ones, or tubercles, like small Potatoes, which, if not disturbed, will give a succession of Mushrooms."†

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* 'Journal of the Agri-Hort. Soc.,' Vol. IX., p. 320.
† 'Proceedings of the Agri-Hort. Soc. of the Punjab,' Dec. 1865, p. 10.

Morchella esculenta.

MOREL.

Khumb.

An edible fungus, well known in Europe, and produced in the greatest abundance in Kashmir. Dr. Henderson states that at Shahpoor and most other districts, where there is Kuller in the soil, it is very plentiful in August and September after the rains. Mr. Pannell says also that it is to be found in Lahore in considerable quantities.*

Mr. Berkely states that it is grown much in Germany, and that it is particularly partial to a burnt soil.

Tuber. *Sp. var.*

TRUFFLE.

Until the successful attempt made by M. Auguste Rousseau, of Carpentras, some years ago, the Truffle had not been made subject to the control of the gardener. In this country it is not likely that it will ever be had but by seeking it in those spots where it is produced spontaneously. There are several edible species, but it has not been till lately that any have been known to be natives of India. Colonel Elphinston pronounces a certain fungus found in the Kangra Valley to be a true Truffle; and describes it as a "round rootless tuber with a thick skin, which when peeled and cut displays the anastomosing veins and granular formation of the true Truffle. It grows a few inches under the soil, some of the larger ones making their appearance above the surface. It is of an earthy yellow colour, not unlike a potato in appearance. The Kangra Truffle is found only where the **Pinus longifolia** grows, and there in great abundance. Colonel Elphinston adds, that when cooked it proved highly flavoured and of excellent quality.†

GRAMINACEÆ.

Zea Mays.

MAIZE—INDIAN CORN.

Bhoota—Mukka.

The unripe and tender heads of Indian Corn, when cooked, are considered by most persons a most delicious vegetable. They are first

* 'Proceedings of the Agri-Hort. Soc. of the Punjab,' Dec. 1865, p. 11.
† Ibid., p. 7.

boiled in milk, afterwards roasted, and then eaten with butter and pepper and salt.

The plant is a native of Mexico; but though it has now become thoroughly naturalised in all parts of India, it seems to have much degenerated, as the produce it affords is vastly inferior in every respect to that raised from the seed imported annually from America by the Agri-Horticultural Society.

The usual season for sowing the seed is about the beginning of the rains, even on the hills. It should be sown in rows a foot apart, and the grains at eight inches apart in the rows. No particular care is required in the cultivation. The heads will be fit for use in August and September.

ARACEÆ.

Colocasia antiquorum.

Kuchoo—Ghoyân.

A native vegetable, of which the tubers, nearly resembling in outward appearance those of the Jerusalem Artichoke, are the part eaten. The mode of cooking them is to pare them and fry them in ghee. They are not in great request with Europeans in Bengal, where Potatoes may be had all the year through; but in the North-West Provinces, where Potatoes are generally unattainable during the months of July, August, and September, they are much consumed in the way of a substitute. In flavour they are not very unlike Salsify.

They are cultivated much in the same way as Jerusalam Artichokes. The smaller of the tubers, being saved for the purpose, are planted about the end of May. The ground should be first well dug and broken up, to render it loose, and then furrows drawn across it, fourteen inches apart and four or five inches deep; in these the tubers should be laid, at fourteen inches apart, and the soil then covered in. They will require irrigation about every four days.

Not cultivated on the hills.

ZINGIBERACEÆ.

Zingiber officinale.

GINGER.

Udruk.

There is no difference, it is stated, between the Ginger of this country and that of Jamaica, but what results from the way in which it is cultivated.

The planting should be made about the end of May, both on the hills and on the plains, just before the rains commence, in a very rich light soil. Drills should be made a foot apart and two or three inches deep. In these pieces of the tuber should be laid at about a foot apart, and covered in with soil. When the plants begin to grow they must be earthed up, and, if the rains have not set in, well watered. About January the roots will be ripe for taking up, when, having been well washed, they may be stored away.

For ordinary use, however, it is hardly worth while to cultivate Ginger in a garden, as it may always be purchased cheaply enough in the bazar; but if it be required for making a preserve of, it must be grown for that especial purpose. In that case the tubers should be taken up as early as possible after being formed, in their youngest and tenderest condition. This will be when the plants are not more than five or six inches high.

The following directions for making the preserve may perhaps be found useful :—

Scald the tubers, wash them in cold water, and peel them clean. This will take some three or four days to accomplish. Make a syrup of the proportion of a pound of sugar to a pint of water, into which stir gradually the beaten whites of two eggs. Boil and well skim it. When quite cold, pour it over the Ginger; cover it up and let it remain so two or three days. Then pour it off from the Ginger, boil, skim, and clarify, if necessary, the syrup again, and when cold pour it a second time over the Ginger, and let it remain three or four days. Then boil the syrup again, and pour it hot over the Ginger. Proceed in this way till you find the syrup has thoroughly penetrated the Ginger, which you may ascertain by its taste and appearance when you cut a piece off, and till the syrup becomes very thick and rich. If you put the syrup hot to the Ginger at first, it will shrink and shrivel.*

Grown in the warm, moist valleys by hillmen.

Curcuma longa.

TURMERIC.

Huldee.

Turmeric, of which such large quantities are used by the natives for curries, may be always procured cheaply enough in the bazar, and is rather an agricultural produce than one to be raised profitably in the garden.

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* Condensed from Miss Leslie's Cookery Book.

The cultivation of it is carried on in the same way precisely as that of Ginger or Arrowroot. The tubers are put down in May, a foot or more apart, in rows. The plants earthed up when about eight inches high, and then require no further attention till the crop is ready for taking up in the cold weather.

Not grown on the hills, except in the warm valleys.

MARANTACEÆ.

Maranta arundinacea.

ARROWROOT.

Genuine Arrowroot, such as exported from Surinam and Bermuda, is the produce of the plant above named; but Arrowroot of a spurious kind is also obtained from the roots of two or three other plants. I have been informed that large quantities, the produce of **Curcuma angustifolia,** are exported to England from the Madras Presidency under the name of Indian Arrowroot. This is of a very inferior kind, and may be distinguisded at once from the genuine, which is pure white, by its yellow tinge and by its not thickening in boiling water. Genuine Arrowroot may also be discovered by aid of the microscope, its granules being very distinct from those of any spurious kind. I cannot tell why any but the genuine kind should be produced at all in this country, or whether any difficulty is experienced in the cultivation of **M. arundinacea** on the Madras side; in Bengal the plant may be obtained in any abundance, and cultivated with the greatest ease. Dr. Jameson states, too, that it thrives in the Saharunpore district and throughout the North-West Provinces.

The roots should be put in the ground in the month of May. Drills should be made about three or four inches deep and two feet apart, in which the roots should be laid at a distance of a foot and a half from one another, and the earth covered over them. As the plants grow, they should be earthed up in the same manner that Potatoes are. They love a good rich soil, and plenty of water during the time of their growth; which latter, indeed, they get naturally, as their growing time is during the rains. They bear their small white flowers about August, and in January or February the crop may be taken up for use. A month or two previous, however, water should be entirely withholden, to allow the roots to ripen. They are of a pure ivory-white colour, and should be as large as moderate-sized Carrots. The smaller ones should be reserved for a fresh planting, and the pointed ends also of the larger ones, at the extremities of which the eyes are situated, should be broken off, three inches in length, and kept for the same purpose.

The mode of preparing the Arrowroot is very simple. The roots after being well washed should be pounded to a pulp in a wooden mortar, which may be hired for the occasion from the bazar. The pulp should be thrown into a large vessel of water, which will become turbid and milky, a portion of the pulp remaining suspended in it as a fibrous mass. The fibrous part should be lifted up, rinsed, pounded again in the mortar, thrown again into the water, lifted up a second time, rinsed, and then thrown away. The milky-looking water should be then strained through a coarse cloth into another vessel, and when the sediment has settled, the water should be poured gently off and clean fresh water poured upon the sediment. This, after having been well stirred up, should be strained through a fine cloth, and on settling the water should again be carefully and gently drained away. The sediment, which is then fine pure Arrowroot, should be dried on sheets of paper by exposure to the sun.

Canna edulis.

TOUS LES MOIS.

An article sold in the shops under the name of Tous les Mois bears a very close resemblance in quality and appearance to manufactured Arrowroot, to which it is considered to be superior as a diet for children, in that it is not of so constipative a tendency. Dr. Lindley conjectures it to be the produce of Canna edulis. If it be so, as this plant thrives well in India, the manufacture would be exceedingly easy, by proceeding in the same way as adopted with Arrowroot. Such would be the case likewise if, as Mr. I. M. Jones states, "There is also a giant species of Arrowroot (Canna coccinea), the product of which is known by the name of Tous les Mois."*

ORCHIDACEÆ.

Vanilla planifolia and V. aromatica.

VANILLE.

The Vanille plant thrives well and blossoms and fruits freely in Bengal; but the pods that have been produced and preserved here can hardly be considered satisfactory for use in confectionery. When kept

* The Naturalist in Bermuda.

a short time they have a somewhat sour smell, quite distinct from the fine, sweet scent emitted by those imported from the Mauritius, even after having been kept several years. Whether this arises from the climate being unfavourable to the maturation of the pods, or from the want of proper management in the curing of them, it is difficult to say. It may, possibly, be attributable, in some degree, to both causes. As the pods are not ready for gathering till December, it seems not improbable that they require more warmth during the two or three months when they are completing the ripening process than the climate of Bengal will afford them.

The mode of cultivation practised in the Mauritius, and adopted in the Calcutta Botanical Gardens, is to build at the base of some high tree a small rampart of brickwork, about a foot high, fill it up with a light soil of leaf-mould, plant in it the Vanille plant, and brick over the surface of the soil. In a short time the plant will grow to a considerable height up the tree, clasping it with the ærial roots it throws out as it ascends.

The flower-pot, however, with suitable soil answers, as far as I can see, the purpose equally well as the rampart of brickwork; for in no great time the Vanille plant, after climbing up the tree, disconnects itself almost entirely from the soil at the base of the tree, except by the old dried roots, which seem no longer to convey any nourishment to the plant.

The plants continue blossoming from February to April. The flowers expand early in the morning, at which time they require to be fertilized artificially, or, in this country at least, they will not set fruit. The operation consists in introducing the points of small tweezers into the mouth of the flower, handling it gently, and extracting from the upper lip a small piece of the membrane which encloses the pollen. If not successful, and impregnation has not taken place, it will be known by the circumstance of the flower not dropping from the ovary for full a month or more. If successful, the flower drops off in a day or two.

The plants may likewise be grown with great success in pots, trained upon a bamboo trellis fixed in them; and, possibly, in Bengal this would be found the best plan to adopt, as the plants would thus not only be at command during the whole period of their growth, but might be removed at the commencement of the Cold Season to some warm sheltered situation, instead of being left exposed, as they usually are, to the full force of the cold winds.

Mr. Thwaites directs that "the pods should be gathered when they are commencing to turn yellow at the apex, and killed by immersion for a few seconds in boiling water, or by exposure to the sun. I prefer the latter method, and dry them subsequently

in the shade, or with occasional exposure to the sun, upon tin plates."*

The plant is raised readily from cuttings, which come into bearing in the third year.

Ample directions for the culture of the Vanille plant and the preparation of the pods, as practised at Bourbon, will be found in Volume IX of the 'Journal of the Agri-Horticultural Society.'

Not grown on the hills for its pods; but occasional plants are met with in stoves.

LILIACEÆ.

Allium Cepa.

ONION.

Peeyâj.

There are many varieties of Onion grown in Europe, some of which, such as the Spanish, are of great size. But for this country the most serviceable will probably be found to be the Strasbourg and the Deptford. There are also two large and good acclimated kinds of Onion, known in the neighbourhood of Calcutta as the Patna and Bombay.

The seed of the Onion keeps good but a short time—generally it is said, not longer than a year; and as most of the seed that comes to this country is more than a year old, it is not altogether surprising that, when sown, it is so often found to fail of germinating.

The surest way, therefore, of securing good seed is at the commencement of the Cold Season to purchase several of the finest Onions procurable from the bazar, and plant them out in the garden, about a foot apart. These will grow up, and by the commencement of the Hot Season produce an abundant supply of seed, which should be stored away in well-corked bottles for sowing the next Cold Season.

The time for sowing seed is about the middle of October on the plains, and March on the hills. The sowing may be made broadcast or in drills ten inches apart. The soil should be light, and enriched with old manure, carefully levelled, and in a damp state when the seeds are sown. When the young plants are somewhat advanced in growth, they should be thinned out to about six inches apart.

If imported seed is used, perhaps the preferable method is to sow it in large seed-pans, and when the young plants are about three or

* 'Journal of the Agri-Horticultural Society,' Vol. XIII, p. 53.

four inches high, to put them out in a bed prepared for them in the open ground. They should not be planted deep in the soil. Onions are much benefited by frequent watering. When, by the commencement of the hot season, the bulbs have attained their full size, the stems should be bent down in order that they may more speedily decay. On the stems becoming withered, the Onions should be taken up and laid out two or three days in the sun, and, when well dried, stored away for use.

In the neighbourhood of Calcutta, I have not met with much success in the cultivation of Onions for storing; but in the Upper Provinces, with little trouble, abundant crops can be raised for that purpose. The Catalogues of English and Continental nurserymen and seedsmen contain a list of many fine varieties.

Allium Porrum.

LEEK.

The Musselburgh and the London are accounted the finest kinds of Leek. The lower part of the vegetable when well blanched is very delicious, boiled and served with melted butter, retaining scarcely any of its Onion-like flavour, and forming an excellent substitute for Sea-kale, which it then much resembles. Sowings should be made as soon as the rains are over on the plains, and in March on the hills; and, as this vegetable is much benefited by being transplanted, the seed is best sown broadcast, and thinly, upon a light rich soil. When the plants are about six or eight inches high, the earth in which they are growing should be thoroughly softened by watering, so that the plants may be taken up without injury to their roots. In a well-manured piece of ground rows of holes should be made with a dibble or pointed stick, at the distance of a foot between each row. The holes in the rows should be six inches apart, and about four inches deep. Insert in each hole a young Leek, and a small quantity of earth after it. When all the young plants are put into the ground, give the whole a good watering. As the plants grow, they will require to be earthed up to blanch them. To thrive well they require a great deal of watering. It is said that the tops of the leaves should be cut off occasionally, and that this will induce the roots to swell.

Allium sativum.

GARLIC.

Lehsoon.

This vegetable is very much cultivated by the Natives in most parts of India, and is always obtainable at so cheap a rate from the bazar,

that it is hardly worth while, perhaps, to undertake the cultivation of it in the garden.

The root consists of several small, what are called, cloves. For cultivation, these are planted out in October singly, in drills about seven inches apart, and two or three inches deep. The crop is taken up in the commencement of the hot weather, and the cloves, after being first well dried in the sun, stored away for use.

Allium Schænoprasum.

CHIVES.

This vegetable may be met with in some few gardens, but for the most part is very little cultivated or known in this country. The thin awl-shaped Onion-flavoured leaves are the parts of the plant used in cookery. It is propagated by division of the roots in October.

Allium Ascalonicum.

SHALLOT.

Gundham.

A vegetable not very common in this country. The small Onion-like bulbs are the part eaten. It is propagated by setting out in October on the plains, and from March to May on the hills, the cloves or bulbs about six inches asunder. By the commencement of the hot season, the crop will be fit to be taken up to be stored for future use.

Asparagus officinalis.

ASPARAGUS.

Soot Moolee.

The flavour of Asparagus in this country is much inferior to what it is in Europe. One great recommendation to it, however, is, that it is in season just when all other European vegetables have gone out.

The seeds should be sown in August, or as soon after as practicable, under shelter from the weather, in seed-gumlahs, in very loose mellow earth, both rich and sandy; for, if the soil be at all retentive, the roots, which are very delicate, would, at the time of planting out, be sure to be broken, and the plants much checked in consequence. By the time the rains are over, the young seedling-plants should be about ten inches high.

The most economical mode of proceeding then is, in a plot of ground selected for the purpose, to dig cylindrical holes a foot wide

and two or more feet deep, at a distance of a foot and a half apart. In these, to the depth of about ten inches, throw a compost of equal parts of mould and well-decayed manure, with a small quantity of saltpetre. Put one plant in each, spreading the roots horizontally, in a fan form, and taking great care not to break them in doing so. Well water them, and continue to do so constantly, never allowing the soil to become at all dry. As the plants advance in height, so keep filling in soil well enriched with manure. In three or four months' time the holes will thus become filled up to a level with the surrounding ground. About the end of April, or in the beginning of May, they will bear flowers, the removal of which, before forming seeds, though considered by some a needless trouble, will conduce to strengthen the plants. It is, however, of great importance that no portion of the foliage should be plucked, but rather be encouraged to make as vigorous a growth as possible. When the rains commence, the plants will require no further attention; they will send up, at that period, several shoots, from which cuttings might be made for table use; but it is far better to spare them and allow them to grow into branches, and not make any cuttings till the following year. In the cold season the stems will die entirely down, and the plants remain dormant till March, when they will make indications of again sprouting. At this time, therefore, preparations may be made for what is called "forcing" them for the table. The earth should be removed till the roots of the plants are reached, and a good rich dressing of manure supplied; after this they should be well watered daily. In about a fortnight's time fine green heads will begin to show themselves above ground, which may be cut for the table.

Asparagus-beds wear out, it is said, in three or four years' time; but this depends much, I believe, on the way in which they are treated. If, at the commencement of the growing-season, they be well enriched with manure, and afterwards constantly well watered, and the plants not cut too severely for use, they will last unimpaired probably for very many years. Salt is usually recommended as a fine manure for Asparagus; but I have been told by one of our best practical gardeners in this country, that he has applied it without perceiving any benefit from it.

The treatment recommend above will apply to the hills, except that the seed must be sown in March.

Asparagus racemosus.

Belaitee Soot Moolee.

Of the blanched young shoots of this plant, the Natives at Dacca prepare a very agreeable conserve in the way of preserved ginger.

DIOSCOREACEÆ.

Dioscorea.

YAMS.

Dr. Roxburgh describes as many as seven eatable Yams, but not more than three or four can be accounted of any value for the table; and where, moreover, Potatoes are so plentiful throughout the year as they are in Calcutta, there seems little inducement for the cultivation of Yams.

1. **D. Globosa**—*Choopree Âloo*—This Dr. Roxburgh states to be "most esteemed of all Yams among the Natives, as well as Europeans." I cannot say that tubers I have purchased from the bazar under the name of Choopree Âloo seem to merit this distinction. Others appear to me to be superior.

2. **D. alata**—*Khum Âloo.*—This is accounted second in order of merit.

3. **D. purpurea**—*Rukto Gurániya Âloo.*—This apparently is the Yam brought by Mr. M'Murray, Gardener to the Agri-Horticultural Society, from the Mauritius, concerning which he states that it is as much cultivated in the Mauritius, as Potatoes are in England, and that it is most excellent. The tuber is of a dull crimson-red outside, and of a glistening white within.

4. **D. rubella**—*Gurániya Âloo.*—A common but very excellent Yam, as good as any, perhaps, in cultivation. The tuber is of great size, crimson-red on the outside, and of a glistening white within.

5. **D. atropurpurea**—*Malacca Yam*—Known also, I believe, in Calcutta as the Rangoon Yam, is very similar to the last, and an excellent Yam. A tuber of this was sent to the Agri-Horticultural Society from the garden of Captain H. B. Weston, measuring two feet in length, and weighing as much as eight seers.

6. **D. Japonica**—*Chinese Potato*—Sent to this country by Mr. Fortune; but possessing no merit that I can see above the two last kinds, which it much resembles.

7. **D. fasciculata**—*Soosnee Âloo.*—A very distinct kind of Yam; the tubers about the size and form and colour of large kidney Potatoes, and, when well cooked, bear a greater resemblance in mealiness and flavour to the Potato than any other Yam I know.

8. **D. sp.**—*New Zealand Yam.*—Presented to the Agri-Horticultural Society by Captain Hill, of Bankshall, and remarkable for producing great ash-grey ærial tubers upon its stems. From the account Captain Hill gives of it, when cooked, it is more to be regarded as a curiosity than for any value it possesses for the table. It has been grown in the Barrackpore Park, and found to be exceedingly prolific.

Yams should be put in the ground in April; the soil having been previously dug deeply and well lightened with old manure so that the tubers may be able to expand freely. The plants are extensive trailers, and are usually grown where they may have some tree to run up, or else have a bamboo-trellis placed for their support. The crop will be ready for digging up in December.

The proper mode of cooking Yams—as, I believe, is pretty well known to all Indian cooks—is, after the tuber has been boiled, to bury it for half-an-hour or more beneath the hot wood-ashes. By this means all moisture becomes dried out of it, and it is rendered nice and mealy.

The following directions, with regard to the cultivation of the Chinese Potato, D. Japonica, given by M. Montigny, the French Consul, who sent it from Shanghai to France, no doubt would apply equally well to all other kinds of Yam grown in this country:—

"For propagation the smallest roots are set apart. In the spring the roots are taken out and planted in furrows pretty near each other in well-prepared ground. They soon sprout and form prostrate stems, which are made into cuttings as soon as they are six feet long. As soon as the cuttings are ready, a field is worked into ridges, along each of which is formed a small furrow, in which the pieces of the stem are laid down and covered with a little earth, except the leaves. If the weather is rainy, the cuttings strike immediately; if dry, they must be watered till they do strike. In fifteen or twenty days the roots begin to form, and at the same time lateral branches appear, which must be carefully removed from time to time, or the roots will not grow to the proper size."*

Mr. J. Henderson, of Kingskerswell, South Devon, likewise gives the following practical directions:—

"The manner in which the Chinese cultivate it is extremely simple. The earth is first formed into ridges, when small tubers or portions of large ones are planted on the top, at about three feet apart; after the plants have attained a little strength, the shoots are spread over the sides of the ridges, and pegged down at the leaf end, six or eight inches from each other (care being taken to cover the joints or parts pegged down with a portion of earth), when they soon strike root and throw out tubers; by this means immense quantities of roots, of the size of early-framed kidney Potatoes, are raised on a comparatively small piece of ground. The above is the ordinary Chinese mode of culture; but to obtain them of a large size, small tubers, or portions, are planted on ridges, from ten inches to one foot apart, and the plants are allowed to grow freely till late in the autumn, when the foliage is cut away and

* 'Gardeners' Chronicle,' 22nd July, 1854.

dried, or partially dried, and given to cattle; the tubers by this means attain on an average 1 lb. and upwards in weight." *

Not grown on the hills.

EUPHORBIACEÆ.

Manihot utillissima.

TAPIOCA—MANDIOC OR CASSAVA PLANT.

The Tapioca plant is described as "a shrub about eight feet high, extensively cultivated for food all over the tropical parts of the world. Of this plant the large root, weighing as much as 30 lbs., is full of venomous juice, which, if taken internally, produces death. The roots are rasped, the pulp well bruised and thoroughly washed, after which the mark is placed on iron plates to be heated. In this way the venom is washed out or driven off, and the residue becomes Cassava. The powder which floats off in the water is a very poor starch, which, when it settles down, becomes Tapioca."†

The plant thrives well in Bengal, and a considerable plantation of it is raised annually in the garden of the Agri-Horticultural Society, though the manufacture of Tapioca is rarely, I believe, resorted to in India.

The season for taking up the crop of roots is in January, at the same time that cuttings are put down for the crop of the following year.

In subjoining the following directions to be pursued in the culture and manufacture of Tapioca, as given by J. P. Langlois, Esq., in the 'Journal of the Agri-Horticultural Society,' I need hardly, perhaps, state how important a point in the manufacture is the driving off by heat on hot iron plates of the poisonous properties of the root. The poison is said to be very volatile.

"*Soil.*—This plant will thrive in any soil, although a sandy loam is the best.

"*Cultivation.*—It requires no cultivation whatever, and is occasionally met with in Arakan, growing wild in the jungle.

"*Propagation.*—By cutting. Care to be taken to use the stronger branches. The cutting must be from two to three feet long; to be placed in the ground in an upright position, and in rows four feet apart.

"*Preparation.*—Twelve months after planting the roots are fit to be dug up. They must then be well washed, and put into a trough with water, in which they are allowed to remain six hours, when the

* 'Gardeners' Chronicle,' 23rd December, 1854.

† 'Lindley's Vegetable Kingdom.'

outer bark will be easily removed by a pressure of the hand. The next process is to grate the roots, and then press out the milky juice, which is poured into a flat tub. This is now suffered to rest for eight hours, when all the flour will subside to the bottom. The water is then poured off, and the meal laid upon wicker-frames to dry in the sun for two or three hours. The flour is then placed upon hot plates, and well stirred to prevent it burning.

"The heat will cause the amylaceous substance to coagulate into small irregular lumps of a transparent and gelatiniform colour. The Tapioca is then ready for use.

"This is the best mode of preparing Tapioca, as customary at the Mauritius."

CUCURBITACEÆ.

Momordica Charantia, *var.* muricata.

Kurêla.

A Gourd from four to eight inches long, thick in the centre, and pointed at the ends and covered with little blunt tubercles, of intensely bitter taste. Much consumed by the Natives; and agreeable also to Europeans occasionally, as an ingredient to flavour their curries by way of variety.

The late General F. Jenkins informed me of two varieties they have in cultivation at Patna:—

1. *Jethuya:* a plant growing in the heat of spring and dying with the first rains.

2. *Bara masiya:* which lasts throughout the year.

The seed is, however, commonly sown at the beginning of the rains, and the Gourd is in use in the cold season, when the plant has rather a pretty appearance, trailing upon the ground, with its small foliage, bright yellow flowers, and curious fruits.

Grown in the warm valleys only by the hillmen.

Luffa acutangula.

Jhinga-Torooee.

A cylindrical, somewhat club-formed Gourd, about ten inches or a foot long, with sharp ribbed projections from end to end. Dr. Roxburgh says: "Peeled, boiled, and dressed with butter, pepper, and salt, it is little inferior to Green Peas."

I am afraid many would be disappointed who put reliance upon this statement: however, that is a matter of taste. The plant is an annual; the seed is sown in the rains, and the vegetable is ready for use in the cold season. There is also a variety with smooth skin, called by the Natives *Gheea-Torooee.*

Grown in the warm valleys only by the hillmen.

Benincasa cerifera.

PUMPKIN—WHITE GOURD.

Châl Koomra—Pânee Koomra.

A very large, handsome, egg-shaped Gourd, to appearance covered with a pale greenish-white waxen bloom; whether much eaten by Europeans I am unaware, but greatly consumed by the Natives. It has a very pleasing appearance upon the thatched dwellings of the Natives, where it may often be noticed in the most exposed and unprotected situations. On inquiry, whether it was not liable very often to be stolen, I was assured that other Gourds in a similar situation would likely enough be stolen, but that there was an especial respect paid to this, upon certain religious considerations, that rendered it perfectly safe.

The plant is an annual. The seed is sown in the rains, and the vegetable is in use in the cold season.

Not grown in hill gardens. The hillmen sometimes grow it in the warm valleys.

Lagenaria vulgaris.

BOTTLE-GOURD—FUKEER'S BOTTLE.

Laokee-Kudoo.

One of the commonest of the native vegetables, a moderate-sized Gourd having the appearance of two oval Gourds united endwise, or of an inflated bladder compressed by a cord around it. Cultivated in all parts of India; cut up into slices in the manner of French Beans, it affords a palatable, but rather insipid dish about the beginning of the cold season. The plant is an annual, and seed should be sown in June.

Not grown in hill gardens.

Cucumis sativus.

CUCUMBER.

Keera.

There appear to be two kinds of this vegetable, either domesticated in this country or indigenous; but neither have the delicacy or fine flavour of the European kinds.

1. The one grows to a very large size, is green when young and becomes darker as it ripens, and mottled with whitish stripes from end to end. This seems to be the Nepâl kind, described by Don and other writers as cultivated in Calcutta, and growing to as much as

seventeen inches long. I have not met with it of that size, but find that it is considered very large when of no more than twelve or fourteen inches in length. It is hardly fit for eating uncooked when more than six inches long; much beyond that size it is tough and tasteless.

2. The other is of smaller growth, and of a creamy-white colour when young, turning to a rusty colour at the ends as it ripens. This answers nearly to the description of the one called the "White Turkey." It is the better of the two for stewing; cooked in which way it affords a very delicious dish during the rains, when so few other vegetables are to be had.

The plants of these two kinds have very long and powerful stems, which are generally trained to run up a tree. The seed is sown in July or later, and the Cucumbers are in season during all the rains.

I have tried to raise Cucumber plants from American seed at the same period of the year, but uniformly without success. The plants made no growth, became sickly, and perished without blossoming. Towards the end of the rains, I have raised plants which blossomed and gave promise of fruit, but perished without yielding any. I have again sown the seed at the end of October, and the plants, put out in rich soil in large deep earthen pans, and trained upon a trellis in a verandah, have in two months' time produced small Cucumbers, with much of the flavour and delicacy of the European vegetable; and no doubt would have been much finer had I sown English seed of a superior sort. The great difficulty in cultivating this vegetable, when raised from imported seed, is to protect it from the ravages of certain small red beetles, which visit the plants in great numbers, and entirely devour the leaves as soon as the first four or five are formed. A rough framework of bamboo might be easily constructed, with common mosquito-curtain leno stretched over it, which would perhaps be a safeguard against their depredations. The trifling expense thus incurred would be well bestowed to obtain this delicious vegetable in perfection. Some of the fine English varieties have been cultivated with much success in the "Ram Newas" garden at Jeypore, in Rajputana. The seeds were sown in October.

On the hills, the English Cucumbers do remarkably well. The seed should be sown from March to May, and with slight protection yield fine fruits. A rich soil is necessary.

Cucumis utilissimus.

Kukree.

A bright-red Gourd when ripe, of the size and form of a very thick Cucumber. When young of a cylindrical form, and ribbed, and in that

state eaten much by Europeans in the North-West Provinces, in lieu of Cucumbers, being in season long before that vegetable, but not to be compared with it in flavour.

The seed is sown in March there, and the vegetable is in use in the hot season.

On the hills, sow the seed in April, and protect the plants from cold at night.

Cucurbita Melopepo.

SQUASH.

The name Squash is given in America to two or three kinds of Gourd of the same description as the Vegetable Marrow.

1. One is called the Lima or Cocoanut Squash, from its resemblance in shape and size to a Cocoanut.

2. Another is called the Marrow or Scallop Squash, from its similarity in shape to the shell which bears that name.

A writer in the 'Gardeners' Chronicle' says :—"Squashes are extensively grown in America. The seeds are either set in a hollow basin, one or two in a place, or on hills. They are of various kinds and qualities, and are boiled green like the Vegetable Marrow, or mashed like the Turnip with milk and pepper and salt. When ripe they are made into pies in the same manner as Pumpkins. Some are gathered in France when of the size of an egg, boiled whole in salt and water, laid upon toast, and eaten as Asparagus."*

In Lower Bengal, the seeds should be sown in the open ground about the end of October. The plants will require a large space of ground to trail over, so select a spot where they may have room for that purpose.

The best plan, then, is to dig holes in the earth about sixteen inches wide and as many deep. Fill these with richly-manured soil, and sow in each two or three seeds. If more than one germinate, pull all but one up.

When the plants have formed about four of their rough leaves, they will, almost to a certainty, become attacked by the red-beetle mentioned as so injurious to the Cucumber. The mâlees usually throw wood-ashes over the leaves to protect them, but this obviously is very injurious to the plants. If, however, the plants can be preserved through the earlier period of their growth, a change seems to take place in the nature of their juices, insomuch that the young leaves are no longer liable to be attacked by this insect, and in the course of a week or two, they will come into flower. When they have set as

* 'Gardeners' Chronicle,' January, 1862.

many fruits as the vine will bear, the flowers upon the plants should be removed. They require constant and copious watering, and occasionally with liquid manure.

Care must be taken to gather the Gourds whilst tender and ready, as they very rapidly become hard and woody. Miss Leslie, however, observes: "The Green or Summer Squash is best when the outside is beginning to turn yellow, as it is then less watery and insipid than when younger."

In the North-West Provinces, the sowing of the seed must not be made before the end of February, as the plants will not live in the cold season in that part of India. On the hills sow in April, and the vegetable will be in season in July.

Cucurbita maxima.

RED GOURD.

Sufuree Koomra—Lâl Koomra.

A brownish-red, globular-shaped, bluntly-ribbed Gourd, of enormous size, cultivated extensively by the natives for sale in the bazars, where it is cut up and sold in slices; in my opinion the most agreeable far of any of the Indian Gourds. Dressed and cooked with boiled beef, as Carrots are, it can hardly be distinguished from them either in appearance or flavour. An annual; seed sown in the rains; vegetable in use during the cold season; not often cultivated in gardens.

I have not seen this vegetable grown on the hills.

Trichosanthes anguina.

SNAKE-GOURD—CLUB-GOURD.

Chichinga.

A large, greenish-white, club-formed Gourd, of the length of a man's arm, and about four inches thick; of exceedingly rapid growth; eaten, sliced and dressed in the manner of French Beans during the cold season. Seeds sown in the rains.

I have not met with this vegetable as grown on the hills.

Cultivated principally by the natives, frequently upon the edge of a tank.

Trichosanthes diœca.

Pulwul.

A small, oblong, green Gourd four inches long and two broad. Boiled whole or in quarters, it affords rather an insipid dish, but being

in season during the rains, when little else of the vegetable kind is to be had, it proves very acceptable. Not cultivated in gardens, as it is usually to be had cheaply from the bazar. It is in high favour with Bengalis. Propagated by cuttings, division of roots and seeds, during the rains.

This will not live on the hills at all.

MORINGACEÆ.

Moringa Pterygosperma.

HORSE-RADISH TREE.

Suhujna.

The root of this tree is generally used throughout India as a substitute for Horse-radish, to which, however, in flavour it is much inferior. Plants are easily raised from seed, and are of exceedingly rapid growth. The long unripe seed-pods are greatly consumed by the natives in their curries. When cut into pieces about for inches long and boiled, they have a most agreeable flavour, hardly to be distinguished from that of Asparagus, and would be an excellent vegetable for the table, were they not of so fibrous a nature. They are produced in the month of March. Sow the seed in June and July.

BRASSICACEÆ.

Nasturtium officinale.

WATERCRESS.

Watercress thrives well in all parts of the country, and abundance of it may be easily raised in the cold season for salad. The plants are propagated from seed or cuttings in October. In gardens where there is a tank, the best plan, perhaps, is to sow the seed or plant the cuttings in rather shallow pans with a few small holes in their bottom, and half filled with soil. Place the pans along the edge of the tank, so that the bottoms may be immersed; the water, penetrating through the holes, will keep the roots of the cress continually wet. As the water sinks in the tank, which it will gradually do during the cold season, lower at the same time the pans into it. Ordinary beds kept flooded will yield good crops in the cold season.

Sow from March to May on the hills.

Cochlearia Armoracia.

HORSE-RADISH.

Horse-radish has been now for some years grown, but can hardly be said to have been cultivated in India. As exhibited at the Calcutta annual vegetable shows, it is always in the condition of a number of fibrous roots of different degrees of thickness, twisted in every kind of crooked form, instead of being, as it ought to be, one single straight stout stick.

The mode of cultivation adopted in England is to bury pieces of the root, an inch and a half long, a foot deep in the ground, which, by a year or two after, will grow up and reach the surface, and then be fit for taking up for use. This method will apply on the hills ; but on the plains I have not been successful with it, as the pieces of root I deposited below the ground I found in a very short time perished.

The plan I then resorted to, with perfect success, was as follows :—

Place round the sides of a flower-pot, filled with mould, well lightened with silver-sand, pieces of the roots, of the thickness of a quill, and two inches long. These being kept watered, quickly sprout and form rooted plants. Dig holes a foot and a half deep, ten inches wide and a foot apart, on a piece of high ground. Fill the lower half foot with well manured soil, and the remaining upper foot with a light mellow soil, and put one of the plants in each. When they have been established about a week or two, remove the earth from the roots, and clear away all the small fibrous roots that have formed, leaving only one main root to proceed downwards. Repeat this three or four times at intervals, removing the earth deeper each time for the purpose. When the main root has descended about a foot deep, which it will do in a very short time, by being cleared of all fibres upon it but those at its very extremity, it will have reached the rich soil at the bottom of the hole. Remove then the uppermost foot of soil, and fill in with silver-sand. This answers two purposes. The water given to the plants will immediately sink down through the sand to the roots, where it is alone wanted ; and the main stem of the root will not be induced to form fibres on its sides. The roots will be ready for use in about four or five months' time.

This plan may seem troublesome, but it is not very much so in reality. The Horse-radish, however, may be grown like any other ordinary plant, by merely putting out the plants in a good soil, on a high piece of ground, at the distance of a foot or more apart.

Lepidium sativum.

CRESS.

Hâleem.

Cress-seed may be sown in the open ground when the rains cease in October. It is best to sow only a small quantity at a time, and to keep up a succession of sowings, at short intervals, during the cold season. As the mâlees rarely cut it for use till it is three or four inches high, it is as well to sow it broadcast, and rather thinly.

If, however, it be required to be eaten, as is usual in England, when little more than the seed-leaves are formed, it may be raised at nearly all times in the year. It is best in that case to make the sowings in large shallow pans, filled with good light soil. The soil should be well watered, and the seed then scattered thickly over its surface. Over the pan a covering should be placed till the seeds germinate, and then be removed. In a few days the cress will be fit for cutting.

In order to save seed, in the early part of the cold season, plants in the open ground at about six inches apart should be reserved. These by the commencement of the hot season will yield a plentiful supply of seed, which should be carefully stored away for future use.

Sow the seed from March to June on the hills. It requires no further care beyond watering regularly.

Brassica oleracea.

CABBAGE.

Kobee.

The varieties of Cabbage cultivated in Europe are very numerous; but between many of them there is scarcely a perceptible difference, the merit of each consisting principally in its being better adapted than others for the particular season at which it is raised. In this country, however, as there is only one season when the Cabbage can be cultivated at all, a number of varieties would be useless. A selection, therefore, of some three or four of the best is all that can be required.

Among these the Early York may perhaps be considered indispensable, both for the quickness of its growth and the delicacy of its flavour.

Any one or two of the following kinds, which are all of established reputation, may be added :—Battersea, Emperor, Nonpareil, Paignton, and Imperial. The kinds, seeds of which are annually imported by

the Agri-Horticultural Society from America and the Cape, besides the Early York and Battersea, are—

THE SUGAR-LOAF.—So called from its peculiar shape; not a very desirable variety for this country, as it has no especial merit as regards flavour to recommend it; and its outer leaves are very apt soon to decay from exposure to the sun.

SAVOY CABBAGE.—A variety with curly or crumpled leaves, forms a dense compact head, and is of very strong flavour; bears the heat of this country better perhaps than any other.

DRUMHEAD.—A coarse Cattle-Cabbage, of immense size, not admissible into the garden.

RED CABBAGE.—A small variety of the Drumhead kind; forms a densely close head; used only for pickling.

The beginning of September is about as early as sowings may be commenced with any advantage. The attempt to raise Cabbages earlier is attended with great trouble, and generally with but little success. Occasional sowings may be made for succession of crops up to the end of the year, later than which it is not of much use to continue them.

The earlier sowings, to be more conveniently protected from rain, had better be made in large gumlahs. As the seed, if good, germinates in two days, it is best to test it by a trial sowing, and then to sow it only just as thickly as to render it unnecessary to thin out the seedlings. If the seedlings, notwithstanding, come up too crowded, they must be pricked out immediately to two inches apart. To prevent damping off, they must have as much light as can possibly be given them, short of direct sunshine. They must, at the same time, be carefully kept from exposure to heavy rain.

It is better not to be in too great a hurry to put the young plants out in the open ground. If they become large and crowded in the gumlahs, they had better be thinned out and transplanted into other gumlahs, rather than put out in the ground before the rains are over, although that may not be before the middle of October.

The soil where the plants are to be grown can hardly be made too rich with manure. The most economical way of proceeding is to draw rows of lines a foot and half apart. In these dig holes about eight inches wide and eight inches deep, at intervals of a foot and a half apart. Fill up the holes with a rich compost of mould and manure, and put in each a Cabbage plant. The young plants will require to be protected from the sun for three or four days. A broken Flower-pot or a Plantain leaf placed over them in the daytime and removed at night answers the purpose well. They should not be suffered to flag for want of water; and when they have become well established and are making growth, the application of liquid manure

will be highly beneficial. Frequent watering will have the tendency to make the earth cake and harden on the surface. When this happens, it should be broken up by hoeing round the stems.

The Cabbage takes about four months from the time of sowing to come to perfection.

When a head of Cabbage has been cut, if the stump be left in the ground, it will send out side shoots and produce two or three nice heads, little inferior to the one that was cut.

When the hot season, moreover, approaches, and the Cabbages no longer form heads, young sprouts will be produced from the old stalks, affording a nice supply of greens for the table till a very late period.

On the hills begin sowing the seed about the middle of February, under glass and in pans or pots, with bottom heat. Put out the seedlings, when well established, about the third week in March. Successive sowings can be made up to July. After March the seed may be sown in the open. A good, rich soil is indispensable.

COLEWORT—COLLARD.

Cabbages cut for cooking when little more than half-grown, and before they have begun to form a head, are usually called "Greens." The particular kind above named and Vannack are accounted best for the purpose; but some persons consider that nearly all kinds answer equally well.

In this country, in the way of Greens nothing can equal Cauliflower-plants, cut when not quite half-grown, for flavour and delicacy.

BRUSSELS SPROUTS.

A variety of Cabbage, which, instead of forming one single head, produces numerous small ones, of about the size of a pullet's egg. It is in season in Europe during the hard weather when other vegetables of the sort are unattainable, and is accounted then a great delicacy.

I have tried to cultivate it, but though the plants throve well, they did not produce the crop of little compact heads they do in Europe, but only ill-formed bunches of small leaves, quite unfit for the table. At the several vegetable shows of the Agri-Horticultural Society I have visited at Calcutta, I have never seen satisfactory specimens of this vegetable exhibited. It succeeds in the cold climate of the Upper Provinces perfectly, as well as in the hills. In the former, the seed should be sown in October, and on the hills from March to September.

BORECOLE—SCOTCH KALE.

A variety of Cabbage remarkable for its crimped and plumelike leaves, which spread abroad loosely, and never form, as other kinds do,

a compact head. Its principal merit in Europe consists in its great hardihood. In this country, there can be no reason for cultivating it on that account. It has consequently little to recommend it, but its curious and ornamental appearance. The time and manner of cultivation are the same as for any other kind of Cabbage.

For the hills, the remarks on Cabbage apply to this.

CAULIFLOWER.

Phool-Kobee.

There are numerous varieties of Cauliflower given in the English seedsmen's lists, but none are to be preferred to the sort called "Walcheren," which is of old and well-established reputation. In the Upper Provinces this vegetable, raised from imported seed, may be grown to perfection. Where such is the case, none but imported seed should be made use of. But in Lower Bengal it is from acclimated seed only that it can be brought to produce heads of any size. The fine-looking Cauliflowers sold in the Calcutta bazars, as well as the large specimens sent to the horticultural shows there, are always raised from acclimated seed. This seed, I understand, is commonly obtained from Patna, that being about the most southerly locality in the plains of India where it can be matured. It bears a high price at Calcutta, where as much as two rupees is demanded for one rupee's weight of it.

The directions given for the cultivation of Cabbage apply alike for that of the Cauliflower, except that the Cauliflower requires, if anything, a richer soil and a more liberal supply of manure. Nitrate of Soda is a splendid fertilizer for the Cabbage and Cauliflower tribe.

In the vicinity of Calcutta, plants raised from imported seed grow to a great size, and do not form heads till late in the season, even if they ever form them at all, and then only of about the size of a tea-cup. These, however, will be found of very delicate flavour, and in my opinion superior to those raised from acclimated seed.

Mr. Errington, some time head-gardener to the Agri-Horticultural Society, communicated to me likewise the curious fact, that a large quantity of Cauliflower seed he received from the North-West, and sowed in the Society's garden, proved equally unsatisfactory as that from Europe and America usually does, and produced heads no larger than a wine-glass.

Some cultivators strongly recommend the removal of the lower leaves, as of great efficacy in causing the plants to form flower-heads.

A method I have found very successful in the cultivation of this vegetable has been to put out the plants, when very young, singly into small pots, and when they have outgrown these, to shift them into others just about large enough for them to complete half their growth

in; and when the rains are over to transfer them to their places in the open ground. If planted so deep that the whole of the stem is buried beneath the soil, very little, if any, earthing-up will be required afterwards. By exposing the plants to the sun a few days before removal from the pots, they will not flag or in any way suffer on being put out into the open ground. This may seem an unnecessarily troublesome mode of proceeding. I am, however, inclined to believe that it is one which involves less trouble than any other. The pots can be kept in a place where the plants are protected from over much wet and sun, and, with the exception of being regularly watered, left almost to themselves. Thus all the earthing-up and constant attention which takes up so much of the mâlee's time may be saved, and the risk of damping-off avoided as well. Moreover, the cramping of the roots in pots during the earlier period of their growth has been attended, as I have thought, with the usual beneficial effect of inducing the plants more readily to form heads of bloom; and this, as regards plants raised from imported seed, is a point of the greatest consequence.

The cultivation on the hills is precisely similar to that of the Cabbage, and the directions for it will apply to Cauliflower.

SPROUTING-BROCCOLI.

A variety which, instead of forming one large single head, produces numerous small ones on the axils of the leaves. Its principal merit in Europe consists in its supplying an excellent dish at a period of the year when no other variety of Broccoli or Cauliflower is to be had. It is, however, an inferior vegetable and possesses no particular merit to recommend its cultivation in this country.

I have made attempts to cultivate it, but with no success; nor have I seen at the Calcutta vegetable-shows any specimens but what were uniformly most unsatisfactory.

On the hills, same cultivation as Cauliflower.

BROCCOLI.

Of this vegetable there are several varieties mentioned in the English seedsmen's lists. Broccoli, however, is itself only a description of Cauliflower, or more properly, perhaps, a name given to a group of Cauliflowers which are able to sustain a severer degree of cold. A distinction, therefore, between Broccoli and Cauliflower is hardly to be recognised in this country, where the cultivation of both vegetables must be in every respect essentially the same, and carried on at precisely the same season.

On the hills sow from February to September.

KNOL-KOHL—KOHL-RABI.—TURNIP-ROOTED CABBAGE.

There are two varieties of this vegetable, the purple and the green, very much the same in point of merit. The best seed is obtained from the Cape of Good Hope.

For the manner of cultivation the same directions apply in every respect as for the Cabbage, except that the plants, not requiring so much room, may be put out somewhat nearer to one another.

Knol-kohl takes about six weeks or two months to arrive at a state fit for the table, and is always most acceptable, as being the earliest European vegetable of the season. If allowed to grow to a great size, it becomes hard, woody, and strong in flavour. It is in its best condition when about the size of an orange. The upper half of the vegetable is always the most tender.

On the hills the cultivation recommended for Cabbage will apply to this.

Brassica Rapa.

TURNIP.

Selgum.

There are several varieties of the Turnip, both of the white and of the yellow. Remarkably fine specimens of many of these are raised in this country in Upper India, but they mostly have a strong and rather acrid flavour in Lower Bengal and Calcutta, rendering them far from agreeable. For cultivation, therefore, the earliest sorts would be the more desirable, being quickest in growth and of mildest flavour. None, perhaps, will be found to surpass the Whitestone, and the early Flat Dutch.

The time to commence sowing the seed is about the middle of October. The sowing may be made broadcast; and in order that it may be done evenly, which is of great importance, the seed should be mixed with about four times its bulk of dry silver-sand. But the better plan, perhaps, is to sow it in drills, about a foot apart, and then at the very earliest stage of their growth to hoe out the seedlings to the distance of a foot from each other. Nothing can be more injurious to the plants than to allow them to be in the least crowded, for in that case they expend themselves in leaves, without forming bulbs.

The soil, which before the sowing should be well dug up, ought to be of a light quality, but not recently manured. The plants require to be abundantly watered to promote rapid growth.

On the hills sow from March to September.

Sinapis alba.

MUSTARD.

Râee.

Scarcely any directions can be required for the cultivation of Mustard. The seed, sown broadcast, and very thickly in a small piece of ground at any time in the cold season, beginning from October, will be up in two or three days, and shortly afterwards supply cuttings for a salad. To secure seed, a few plants raised at the commencement of the cold season should be allowed to remain. These will afford an abundant crop of seed just as the hot weather sets in.

On the hills sow from February to September.

Crambe maritima.

SEAKALE.

This vegetable is not cultivated with success on the plains of India. The seed is very small, and contained in a seed-vessel of the size of a pea, of a hard horny nature, and which takes a month or more to lie in the ground and soften before the seed can sprout. I have raised plants from seed sown in October. They put forth a few thick leathery leaves, but though apparently healthy and vigorous, made little growth, and soon perished after the commencement of the hot season.

On the hills sow from February to September.

Raphanus sativus.

RADISH.

Moolee.

There are two principal kinds of Radish, the long-rooted and the turnip-rooted. The former is, perhaps, of the two the more tender and delicate, but the latter requires less care in cultivation.

Radishes raised from seed sown much before the middle of October will generally be found tough, acrid, and hardly eatable. It is little better than wasting the seed to commence sowing earlier.

The soil, if of a close nature, will be the better for being lightened with wood-ashes. It should not have been recently manured. A partially-shaded situation is the best.

The sowing may be made broadcast, which is least troublesome; but the way recommended by English gardners, and the more economical one, is to sow in drills. The drills should be in rows, three or

four inches apart, and the seed should be buried in them a quarter of an inch deep. After the sowing the ground should be well trodden down, or the Radishes will not be well formed. When up, the young plants may be thinned out to three or four inches apart.

The seed usually germinates in three days, and the Radishes are ready for pulling in somewhat less than a month afterwards. Consequently repeated sowings for succession crops had better be made at intervals of ten days or a fortnight between.

"The turnip-rooted," Captain Weston states, "transplant very well if taken up young, and give much finer Radishes than the seed-bed; being larger, milder, and more crisp."

Radishes require to be well watered during growth, and the soil upon becoming at all dry and caked should be hoed. There is a description of Radish, apparently indigenous to this country, produced sometimes of an enormous size, and much consumed by the natives in the Upper Provinces during the cold weather. It is extremely mild and tender, but totally devoid of the fine flavour for which the best European kinds are distinguished.

Raphanus caudatus: Rat-tailed Radish, is a singular vegetable that has lately come into cultivation, and is remarkable for the strange-shaped pods it bears, which soon reach a length of as much as three feet. The plants when up will needs have to be thinned out to about a foot and a half from each other.

On the hills succession sowings may be made every 15 days from March to September.

MALVACEÆ.

Abelmoschus esculentus.

OCHRO—OKRA—GOBBO—LADY'S FINGER.

Dhenroos—Ram-Torooee—Bhindee.

This vegetable, so common in all parts of India, grows to about two or three feet high, and is familiar to most persons from the large, handsome yellow flower it bears. The erect hornlike pods, when cooked for the table, are of an agreeable flavour, and may be used for thickening soups and gravies. The mucilage contained in the pods may, however, be in a great measure removed by cutting them into small pieces, and frying them, instead of boiling them only, as is more commonly done.

They are valuable, moreover, for affording a dish at the close of the rains, a season when frequently Potatoes and other vegetables are scarcely to be had.

The seed should be sown at the beginning of the rains, and the plants put out at two feet apart. Any ordinary garden-soil suits them.

I have not met with this grown in hill gardens, except by hillmen in the moist warm valleys.

POLYGONACEÆ.

Rheum.

RHUBARB.

A vegetable extensively cultivated in Europe, for the delicious tarts and preserves made of its large thick leaf-stalks.

I have succeeded in raising plants from seed sown in November, the leaf-stems of which attained before the hot season to the length of four inches, and the thickness of a man's little finger. The seed was sown in a gumlah, and the young plants put out into large pots full of soil well enriched with old cow manure and wood-ashes; one in each pot. They perished at the commencement of the hot season.

There seems, indeed, little probability that Rhubarb raised from seed can ever be cultivated successfully in the plains of India, for seedlings take two years before they become fit to be cut for table use—an age they could never attain to here, as the plants will not live through the hot season.

But as Ruhbarb is cultivated in the Nilgherries, it is not improbable that were plants of one or two years' age brought down thence in October, and planted out, two feet apart, in well-manured ground in a shady situation, and abundantly watered, they would yield a supply of cuttings for the table in February. This might easily be tried, and if found successful would well repay the trouble and expense.

When in full vigour of growth, Rhubarb delights in very rich manure, and requires the most shady situation that can be given it.

It can be grown to much perfection on the hills. Sow the seed from March to May, and plant out in good rich soil as soon as the seedlings have made the first four leaves. They will require no further attention beyond regular watering during the dry months, and proper drainage during the rains.

Rumex montanus.

FRENCH SORREL.

This plant has large succulent leaves of the size of those of a Cos-lettuce, and less acid than those of the common Sorrel, which in appearance it in nowise resembles. It is an excellent ingredient to

use abundantly in soups, and serves to impart a peculiarly fine flavour to omelettes.

Dr. Fabre Tonnerre told me he had it in his garden at Calcutta thriving well, and available for use all the year through. Even in Europe it requires a shady situation, more especially therefore will it do so in this country. It requires, no doubt, a rich soil and abundant watering, as the quicker and more luxuriant its growth the milder and more agreeable its flavour. It is easily raised from seed; but the more ordinary mode of propagation is by division of the roots.

I have not met with this on the hills.

AMARANTACEÆ.

Amaranthus oleraceus.

Sâg.

This and its varieties are extensively cultivated by the natives all over India: the plants are fit for use during the rains: the part eaten is the soft succulent stem, which is sliced into small pieces, and dressed in the manner of French Beans. To my taste a most insipid vegetable, hardly acceptable even when nothing else in the way of green vegetable is to be had.

Dr. Roxburgh says there are "several varieties cultivated as pot-herbs, of which the following are remarkable:—

"α. Viridis.—The common green sort. Most cultivated.

"β. Ruber.—A beautiful variety, with a clear bright-red stem, branches, petioles, nerves, and veins, and the leaves themselves rather rust-coloured.

"λ. Albus.—All the parts that are red in β are here of a clear, shining, white colour. Much cultivated in Bengal.

"δ. Giganteus.—Five to eight feet high, with a stem as thick as a man's wrist. The tender succulent tops of the stems and branches are sometimes served up on our tables as a substitute for Asparagus."

Amaranthus Gangeticus.

Lâl Sâg.

The same remarks apply to this as to the last. Dr. Roxburgh says:—

"Varieties of this species, many tolerably permanent, differing chiefly in colour from green with the slightest tinge of red, to rufous, liver-coloured, and bright red. They are more generally used among the natives of Bengal than any other species or variety."

CHENOPODIACEÆ.

Spinacea oleracea.

SPINACH.

Pâlak.

There are two varieties of Spinach: the prickly-seeded with triangular leaves, and the smooth-seeded with round leaves. In Europe, these are sown at two distinct seasons, but in this country the same season is suited to each.

The seed should be sown in October, when the rains are over, broadcast, or in drills, which is the better plan. The distance between each drill should be a foot, and between each plant in the drills four inches. Spinach loves a rich soil and a shady situation well watered. The young plants, if not protected by a net or some other means, are very liable to be devoured by sparrows. On the hills sow from March to October.

Beta vulgaris.

BEET.

Chukandar.

This vegetable appears to be far more generally cultivated in India than it is in England. When sliced and dressed with vinegar, it affords during the cold season an immediate and most delicious pickle. Care should be taken that the root be in no way damaged or cut open before it is boiled, or the colouring matter will be discharged, and it will in consequence lose much of its handsome appearance.

There are several varieties of the vegetable, but they vary more perhaps in form and in colour than they do in flavour; for the table that of the deepest blood-colour is generally held in highest estimation, as it is undoubtedly the handsomest.

The end of September is a suitable time to commence sowing; previous to which the soil should be tolerably manured, dug deeply, and well broken up, and rendered as loose as possible.

The seed may be sown broadcast; but a far better plan is to draw drills over the prepared plot of ground at the distance of a foot apart; and then another set of drills, also a foot apart, crossing the first ones at right angles. Where these drills cross each other, drop in two or three seeds. In the places where more than one of the two or three seeds sown come up, all but the one should be either pulled up and thrown away, or taken up carefully and planted where they are wanting. The seed usually germinates in three days.

The young seedlings being much of the colour of the soil in which they grow, are hardly visible at first. The ground therefore should be narrowly examined before it be concluded, as it often prematurely is, that the sowing has failed.

Sparrows are excessively fond of the young plants: where, therefore, these birds are numerous, it is indispensable that a net should be spread over the ground at the time the seed is sown, and left there till the plants have attained a considerable size, otherwise not a vestige of them will be left.

It is not an unusual plan to make sowings of Beet in gumlahs; and when the plants are about six inches high, to put them out in a piece of ground prepared for them. The advantage of this method is that it admits of the sowing being made earlier, and so of course secures an earlier crop.

A second sowing, about a month or six weeks later, may be made for a succession. Abundant irrigation is very beneficial to this vegetable, especially frequent watering with liquid manure, to which the addition of a little salt has been recommended. Frequent loosening of the soil is also highly advantageous, and more particularly so is the removing of the earth from the upper portion of the roots, and taking away all small fibres that form upon them.

Beet-root is often produced of an enormous size, but the best for culinary use is that which has attained to little more than the thickness of a man's wrist. When grown to a much larger size it is apt to become woody, and disfigured with whitish concentrical rings.

On the hills begin sowing in March. Succession sowings can be made up to September, if necessary. They must be frequently watered during the dry months. A rich soil is indispensable.

BASELLACEÆ.

Basella cordifolia and B. alba.

MALABAR NIGHTSHADE.

Poee.

A climbing plant, with very succulent stems and leaves, used as a pot-herb much in the way of Spinach: cultivated by natives against their dwellings in all parts of India, but hardly recognised as a garden vegetable by Europeans. Propagated by seed during the rains.

Not met with on the hills.

FABACEÆ.

Pisum sativum.

PEAS.

Mutter.

There is no vegetable of which the seedsman's list contains so many varieties as of the Pea, and every year new varieties are added. Between several, however, scarcely any difference exists but in name; and a selection of three, or at the most four, will be all that can by any possibility be needed in an Indian garden.

1. Early Peas, such as Daniel O'Rourke, Early Emperor, Nimble Tailor, &c., grow only to two or three feet high, need no sticks, and produce their crops in about six weeks after sowing. Their earliness of bearing is their chief, if not their only recommendation; for their produce is small, poor, and very deficient in flavour, as well as scanty in quantity.

There is also an acclimated Pea called Grey Pea, *chota mutter*, much cultivated in Bengal, and met with abundantly in the Calcutta markets at a very early period: in my opinion, however, unworthy of cultivation in the garden, being exceedingly small, and all but flavourless.

2. What are called Summer-Peas grow to a greater height, are longer in growing, not bearing till about three months after the time of sowing, and supply a long succession of gatherings for the table. These comprise the different kinds of plump Marrowfats, Prussian Blue, Bedman's Imperial, and others. For size and excellence of flavour of its Pea, no kind surpasses Bedman's Imperial. It is not of very high growth, and yields abundantly, and in long succession.

Equally excellent also is the Pea, annually imported from America by the Agri-Horticultural Society, called the Peruvian—a large, full Marrowfat, with black eye, as is likewise the Eugénie, an early wrinkled variety. The Sugar-Pea, remarkable for its great flat eatable pods, though occasionally grown about Calcutta, is not much to be commended.

3. The late wrinkled Peas, of which there are several varieties, do not appear to me well adapted for cultivation in this country: first, because the seed does not keep so well as that of the Summer varieties, and as often as not proves unsound when sown; and, secondly, because for the most part they grow to a great height, take a long time to complete their growth, and are almost sure to be prostrated by a high wind, either before they come into bearing or when laden with their crop.

Except in a soil that has been exhausted by over-cropping the Pea seems to be abundantly productive without the aid of much manuring. The earth should be well dug over towards the end of the rains to be in a state of preparation for the sowing, which, however, must not take place till the rains are completely over.

Dr. Liebig states that "the Pea thrives best if the seed is put two or three inches deep in the soil. The roots of the Pea-plant do not spread sideways, but go deep into the earth; hence Peas require a deep soil tilled down to the lower layers, and a loose subsoil. Fresh manure has scarcely any influence upon the growth of Peas."

Before sowing the ground should be again dug over and broken up fine, and drills made, running north and south, about two inches deep and about thirty inches apart. In Europe, where it is recommended that Peas should have as much light and air as possible, the rows are made as much as four or five feet apart; but I have found in this country thirty inches ample, and that the plants thrive better for the certain amount of shade they afford one another from their closeness. I also consider that they do better in a spot where they are partially shaded than where they are exposed during the whole of the day to the full power of the sun.

It is better to make a trial-sowing a week or so previous, in order to determine how thickly the seeds should be sown, as well as to check dishonesty on the part of the mâlee, who has sometimes a trick of purloining the seeds from the ground after they are sown, and then maintaining that they were too old and bad to germinate.

If in the trial sowing only a small proportion be found to germinate, it is perhaps the best plan to sow the whole batch in a very light sandy soil in gumlahs, and then transfer to the drills those that prove sound as soon as they have sprouted. This plan it will be found advisable to resort to, more particularly with the wrinkled Marrowfats, which from their softness and apparent immaturity often come to this country in a less sound state than other kinds.

If the seed, however, prove satisfactory, and nearly all good, it may be sown in the drills in a single line a little less than an inch apart. To sow more thickly would not only be to waste the seed, but to have two or three crowded and emaciated plants in the place of each stout and vigorous one. The earth should be damp, as indeed it will be if the sowing is made immediately after the rains; for later sowing it should be watered twelve hours previously, to render it sufficiently moist. The Peas, if sound, will sprout in three or four days; but if, on examining the sowing about the fourth day, by gently removing the earth from

* 'Natural Laws of Husbandry,' p. 154.

the surface, they be found in a foul, dirty condition with the moist earth clinging around them, it may be decided that they are decayed, and preparation should be immediately made for a fresh sowing.

When the plants are about half a foot high they should be earthed up: it is then also the best time to stick them before they begin to fall about. The mode of sticking I adopt is to make the sticks of every two rows lean together so as to cross each other at about eight inches from their tops, and to tie them where they cross.

The plants, when they come into bearing, should be copiously watered, in order to keep the Pea tender, and to prevent it from ripening too soon.

To gather the pods when ready, the mâlee should be furnished with a pair of scissors for cutting them off, and not be allowed to wrench them, as is usually done, from the stems, often causing thereby great damage to the plants.

Sowing for succession should be made at intervals of about a month, but in Bengal not later than the middle of December.

There is perhaps no vegetable that deteriorates less from sowing seed saved in the country, year after year, than the Pea. Any one, therefore, who has once received a good supply of seed, particularly in the Upper Provinces, whither the expense of carriage of imported seed is very great, need require no fresh supply from Europe for many years, if he ever does at all. The seeds saved, however, must be the best produce the plants yield, and not the mere refuse, left after numerous gatherings for the table. An especial crop should be grown for the sole purpose of saving seed from.

The seed, when well dried, should be stored in bottles and carefully corked, as there is a small species of beetle which preys upon them, and which would otherwise enter and destroy the whole stock.

On the hills begin sowing early in March in a sheltered situation at first. Succession sowings can be made up to September every 15 days. A little saltpetre added to the soil previous to sowing will give remarkable results.

Canavalia gladiata.

Mukhun Seem.

A native vegetable: the pod is large, flat, sword-shaped, fully nine inches long, and more than an inch and a quarter wide; though rather coarse-looking, when sliced and boiled is exceedingly tender, and, as I think, about the nicest of all the native vegetables, little if anything inferior to French Beans, and thoroughly deserving of cultivation in the garden.

The plant is a perennial, and a most extensive climber, ascending to the summit of the loftiest trees, and bearing year after year, from the middle of the rains, throughout the cold season, an abundant crop aloft in the branches. Sow the seed in June.

Dr. Roxburgh describes three varieties thus :—

"*a*. Erythrosperma : flowers and seeds red.

"*β*. Erythrosperma : flowers white and seeds red.

"λ. Leucosperma : flowers and large seeds white. Pods about two feet long, often twenty seeded. This variety is considered the most wholesome of them all, and is extensively used at the tables of Europeans, as well as by the natives of Sylhet, where it is indigenous."

I have not met with this on the hills.

Mucuna nivea.

Khamach.

A very excellent native vegetable, but little known, I believe, to Europeans.

Roxburgh says : "By removing the exterior velvety skin of the large fleshy tender pods, they are when dressed a most excellent vegetable for the table, and the full-grown Beans are scarcely inferior to the large Garden Beans of Europe." To me the Beans seem to partake rather of the agreeable flavour of the Lima Bean, and afford a very nice dish during the latter end of the rainy season.

The seeds should be sown in July, and the plants, being supplied with some kind of support to climb upon, demand no further care in their cultivation.

Not cultivated in hill gardens.

Dolichos Sinensis.

ASPARAGUS BEAN.

Burbutee—Lobeea.

A runner Bean, native of India, and common in all parts of the country. In appearance the pods differ little from those of ordinary Kidney Beans, but are very indifferent as to flavour, and have little to recommend them, except that they are produced during the rains, when Beans of other kinds are unattainable. The seeds should be sown in July.

On the hills sow in May.

Lablab vulgare.

A native vegetable : the pod is a broad, flat kind of French Bean, and is dressed and cooked in the manner of French Beans.

Four eatable varieties, met with for sale in the bazars during the cold season, are thus described by Dr. Roxburgh :—

"α. Albiflorum : *Shwet-seem :* flowers white, smallish ; cultivated in gardens, and supported by poles, often forming arbours about the doors of the poor natives. The tender pods eaten like French Beans ; the seeds never. The plant has no disagreeable smell.

"β. Rubiflorum: *Jeea-seem :* flowers red; cultivated like the last, and much esteemed by the natives.

"γ. Purpurescens : *Goordal-seem:* flowers large, purplish. A large variety; cultivated like the last. Legumes broader, with the seeds more remote than any of the other varieties.

"δ. Purpureum : *Rukto-seem :* stem and the large flowers purple. Pods deep purple."

I have not seen this vegetable cultivated in hill gardens.

Lablab cultratum.

A native vegetable of the same character as the last, of which the following description is given by Dr. Roxburgh :—

"All the varieties of this species are cultivated during the cold season in the gardens and about the doors of the natives, forming not only cool shady arbours, but furnishing them with an excellent pulse for their curries, &c., in their tender pods. In short, these and their varieties of L. vulgare may be called the *Kidney Beans of the Asiatic.*

"α. Rectum : *Panch-seem :* pods straight ; seeds reddish ; flowers white, large.

"β. Flacatum minus : *Bâghonuko-seem:* pods falcate, size of the little finger ; flowers white, largish.

"γ. Falcatum majus : *Dood-pituli-seem :* pods falcate, much longer than in β ; flowers purple.

"δ. Gladiatum, flore albo : *Sada-jamai-puli-seem :* pods gladiate-clavate, length of the little finger ; flowers white.

"ε. Gladiatum, flore purpureo : *Pituli-jamai-puli-seem :* pods as in γ ; flowers reddish purple.

"θ. Macrocarpum : *Gychi-seem :* the largest of all ; pods six to eight inches long ; seeds black, with a white eye ; flowers red."

Not cultivated in the hills. Sow in June on the plains.

Psophocarpus tetragonolobus.

GOA-BEAN—CHEVAUX-DE-FRISE BEAN.

Châri-koni-Seem.

A native vegetable : bears a curious four-sided pod, six or eight inches long and half an inch wide, with a leafy kind of fringe running along the length of its four corners. The pod is cooked whole, in the manner of French Beans, to which it is far inferior in flavour.

Though as a vegetable of little value, the plant is well worth a place in the garden, being ornamental for the large blue flowers it bears in the cold season, as well as for the effect of its curious pods hanging upon it. The seed is sown in the rains.

Not met with in the hills.

Faba vulgaris.

BROAD BEAN.

Seem.

Of this vegetable, which possesses in India little of that peculiar flavour for which it is esteemed in Europe, there are two principal varieties : the Long Pod and the Broad Windsor. The latter takes a longer time to mature, is of higher flavour, and for that reason better suited for this country.

Sowings should be made about the middle of October. The seed should first be immersed in a basin of water as hot as the hand can bear, and be allowed to steep twelve hours or more. Unless this mode of softening their rinds be adopted they will remain a long time in the ground before germinating, or if the ground be dry, will fail of germinating altogether.

The seeds are to be put in the ground two inches deep, in rows of double drills four inches apart, with a space of two feet between each row of double drills. When the plants come into full blossom, about an inch should be nipped off from the top of each. This will prevent the formation of more blossoms, and cause those already opened to form pods.

A good plan, and one that saves trouble in the end, is to place the seeds, after they have been steeped, in a gumlah of moist earth, and when they sprout sow them in the ground where they are to remain. It will then be certain that none but sound seeds are sown, and there will be no risk of great gaps occurring in the drills, and of much ground being thus wasted.

Or a better plan still, perhaps, is this :—Sow the steeped seed in large seed-pans filled with soil of a loose texture, about an inch apart. When the young plants are about two inches high, and have become seasoned by exposure to the sun for a day or two, transfer them to their places in the open grounds. Close the earth up rather high about the stems. Abercrombie says the fruiting is accelerated nearly a week by transplanting. In Bengal I have found the Broad Bean very shy of fruiting ; possibly transplanting may conduce to render it more prolific.

On the hills sow in March.

Phaseolus Mutiflorus.

SCARLET RUNNER.

This is an extensive climber, and bears very large seeds, when ripe of a mottled dark-purple character. It is a perennial, and is said to be a native of India ; but it will not survive through the hot months, and therefore must be raised from seed each season afresh. With the cultivation of it as a vegetable I have never had much success, the produce always proving very scanty and unsatisfactory.

The seeds should be sown in October, when the rains are over, in a row, at a distance of three inches apart. I have sown the seeds earlier, and had plants in blossom in the rains. Their old familiar scarlet flowers looked very pretty ; but they dropped off without setting a single pod. The plants, when about three inches high, should have sticks put in the ground for their support.

On the hills sow in March. They do well here.

Phaseolus Vulgaris.

FRENCH OR KIDNEY BEANS.

1. RUNNERS.—Runner French Beans I have found to be far less prolific in this country than the Dwarf kinds ; and as they in no way compensate by their flavour for their scanty produce, it is perhaps desirable to make the principal sowings consist of the Dwarf kind.

The Dutch, bearing small ivory-like seeds, next to the Dwarf kinds, has proved with me the most productive. The plant is of slender habit, does not grow high, and bears long, narrow, very delicate pods.

The seed should be sown in October, in a row, about three inches apart. I have had the plants in blossom in the rains, but found them utterly unproductive at that season.

2. DWARFS.—Of the Dwarf kinds of French Beans, as those are called which require no sticks for their support, there are a great many named varieties. The principal or only difference, however, between

them seems to consist in the form and colour of the ripened seeds. In flavour, at least as regards those cultivated in this country, the several varieties are as much alike as possible.

The first sowing may be made about the beginning of October in a good soil. The seeds should be put in two inches apart, about an inch deep, in rows, two feet between each row.

The seed, if sound, will germinate in three or four days; and the plants will come into full bearing in about six weeks from the time of sowing. As the crops are of short continuance, sowings should be made in succession at intervals of about ten days to keep up a constant supply.

I have not found Dwarf French Beans thrive well except in a situation considerably shaded. Where much exposed to the sun the plants not only make slow growth, but are apt to have their leaves preyed upon and much injured by insects; they then become entirely unproductive.

On the hills, sow from March to June. The same cultivation will apply as for the plains.

Phaseolus lunatus.

LIMA BEAN.

The seeds of this Bean are annually imported from America by the Agri-Horticultural Society, and distributed to members in their usual packet of vegetable seeds. The plant, notwithstanding, is a native of India.

The Lima Bean, Miss Leslie says, is in America held in highest estimation of all. In this country, however, it is not by any means as well known and appreciated as it deserves to be. Besides being a most delicious vegetable, it possesses also the merit of coming into season just when most others are gone off. The pods are rather coarse-looking, and are not eaten; but the large, flat, ivory-like Beans are shelled, laid in a pan of cold water, and boiled about two hours, or till they are quite soft. They then are exceedingly agreeable, having a mealy roast-chestnut-like flavour.

The seeds should be sown in October, when the rains are over, about four inches apart in rows. The plants are of extensive growth, and require strong sticks for their support. A moderately shaded situation suits them best.

On the hills, sow from March to June. This Bean grows remarkably well on the hills.

SOLANACEÆ.

Capsicum.

C. frutescens—Goat Pepper.

C. baccatum—Bird Pepper.

C. annuum—Chilli.

C. grossum—Bell Pepper.

C. fastigiatum—Cayenne Pepper.

Mirich.

There are two principal kinds of Capsicum; the larger, with fruits of the length of a man's forefinger, usually termed for distinction Capsicums; and the smaller, with fruits about an inch and a half long, or less, usually called Chillis. The seeds of the latter when ground form what is ordinarily called Cayenne Pepper.

There are a great many varieties of Capsicum grown in India, some of which are very ornamental when grouped together, and bearing their crops of pods of different shapes and colours—some orange, some bright red, some pale amber, and some purple-black. One in particular bears a remarkably beautiful fruit, fully of the size of a large lemon, perfectly smooth, and of a fine amber-like appearance.

Seeds may be easily procured from England, where the seedsmen's lists contain as many as from ten to fifteen kinds; and among them one, called the "Sweet Spanish," mild enough to be used in salads.

For culinary purposes, however, only two are required in the garden: the common country kind, *Lal-mirich*, and the very small sort called Bird's-eye, *Dhan-mirich*. The latter is of a most fiery, pungent nature, and is used principally for making Chilli-vinegar.

The seed may be sown at any time of the year. The plants bear fruit at all seasons; they do well in any common garden soil, and thrive best in a shady spot.

Sow the seed from March to June on the hills.

Solanum tuberosum.

POTATO.

Aloo.

The varieties of Potato cultivated in Europe are very numerous. In this country there do not appear to be more than four or five varieties ordinarily met with, and those not of very high character, the

best being the red, but rather rare, kind called the Red Californian. The introduction, in recent years, of some of the finer varieties from Europe has added to the supply usually obtainable in this country; but these are mostly cultivated on the hills. In Europe they are generally ready for taking up by the end of August; and if sent out about that time overland to this country, they would arrive just at the proper season for putting in the ground.

In this country, however, where Potatoes may most commonly be obtained from the bazar, it is doubtful whether it be worth while to cultivate them in the garden, whence the produce can be so easily stolen without detection.

The time for planting Potatoes is towards the end of October. It is the general practice in this country to put them in the ground whole. Drills are made two feet apart, and three or four inches deep, into which the tubers are dropped at the distance of a foot apart. The drills are then covered in with earth. When the plants are about eight inches high, they should be earthed up, and water given occasionally, as the ground becomes dry. It is of benefit to the plants to pluck off the flower-buds before they open.

A good, rich, loose soil suits the Potato; wood ashes will be found extremely beneficial, but not one that has been dressed with fresh manure. It is important that the crop should not be grown two successive seasons in the same spot. There is no plant that rejoices more in entirely fresh ground than the Potato.

When the plants come into blossom, they are considered to have completed the number of tubers they will produce. The Potatoes should not be dug up till the leaves and stems of the plants have quite dried up and perished; for it is not until then that they are thoroughly ripe. Water should be withholden a fortnight or more previous to the taking up of the tubers. The attending to the thorough ripening of the Potato not only renders it better for the table, but also makes it keep better when laid in store.

The supply of Potatoes at Calcutta and its vicinity is kept up throughout the year by means of crops raised in the plains and on the hills at two distinct seasons. Those sown in the middle of October in the plains are dug up in February, and continue in use till August or September, at which time supplies are obtained of those that have been grown in the hills, where they were planted in perhaps March or April.

In the North-West Provinces the supply of Potatoes grown in the plains was principally from Futtehpore, where large quantities were annually produced. These failed about July; and from that time for nearly three months, till supplies come down from the hills no Potatoes were to be had.

For the principal crop on the hills, plant about the last week in March and the middle of April. The cultivation is the same as that on the plains.

Solanum Melongena.

BRINJAL—EGG-PLANT—AUBERGINE.

Begoon.

One of the most common of the native vegetables of this country cultivated in all parts of India. There are two varieties, one with the fruits of the size of a large Orange, and in form like an egg; and the other with fruits more of the form of a Cucumber. The fruits of both kinds are of a fine, polished, deep-purple colour, sometimes mottled.

I was informed by the late General F. Jenkins that at Patna there are as many as five varieties of this vegetable, thus named and distinguished:—

1. *Mânik:* three to five to the seer; globular, black.
2. *Gorbhanta:* smaller.
3. *Bara Mâsiya:* cylindrical, black.
4. *Valayeti:* oblong, almost cylindrical, white.
5. *Bhâtin:* many prickles; fruit cylindrical.

The seeds are sown at the beginning of the rains, and the plants are put out at the distance of a foot and a half apart; though, like all other vegetables, benefited by a rich soil, the Brinjal succeeds ordinarily as well as could be desired in common garden earth.

The vegetable comes into season in August, and remains in season from that time to the end of the cold weather. It is valuable for the table during the first two or three months, when few vegetables of any kind are attainable.

Largely cultivated by hillmen in the warm, moist valleys. The seed is sown in April and May, and the vegetable is in season from July to September.

Lycopersicum Esculentum.

TOMATO—LOVE-APPLE.

Bilâetee Begoon.

In the catalogues of the English seedsmen, there are given several varieties of this vegetable. In one I found as many as twenty set down. But except as a matter of curiosity, or merely for ornament, no more than one or two kinds can possibly be required. The fruit of the old kind, commonly cultivated, was apt to become disfigured by ribs and

creases, so much so indeed as not unfrequently to split off into portions. The "New Scarlet Pear-shaped" is said to be free from this defect, and a very handsome fruit. "Trophy" is the largest. But the most recent, "Hathaway's Excelsior," is thus described by a writer in the 'Journal of Horticulture':

"This is a strong grower and very prolific. The fruit is larger, heavy, and handsome, being nearly as round as a cricket-ball, not a rib upon it, and ripening well up to the stem. The skin is thin, smooth, and shining, and the flesh moderately firm. It is a most excellent sort for slicing up in Tomato Salads, and is one of the best Tomatos for general cultivation. The Royal Horticultural Society have had it on trial at Chiswick, and awarded it a first-class certificate."

The "Cherry" and the "Red Currant" are small-fruited kinds pretty for decorative purposes. There is also the "Golden Drop," of the size and shape of an Orleans Plum, of a bright golden colour; but in no way different in flavour from the ordinary kinds.

The seeds should be sown in October in seed-pans; and the young plants may be put out at the distance of three feet apart almost anywhere in the garden, as it does not require high culture. It is usual in Europe to keep pinching off the tops of the stems, just above where they have opened their flowers; but such trouble is hardly needed in this country. It is well that the plants should be grown in a different piece of ground each year in succession.

There is a small kind about the size of a Plum very common, raised from country seed. This is sown about the beginning of the rains, and yields its produce in October.

On the hills the seeds should be sown in pans, with bottom heat, in March; in April, they may be sown without bottom heat. The seedlings should be put out in good soil, when the sixth leaf has formed.

CONVOLVULACEÆ.

Batatas edulis.

SWEET POTATO.

Shukker-kand.

One of the native vegetables of this country, and in common cultivation in all parts of India. The plant is of a very extensively trailing habit, and produces large handsome pink flowers with purple eye; the tubers it bears are of a long, cylindrical form, about an inch or more in diameter, and have a Potato-like mealy consistency,

with a sweetish taste. There are two varieties, the one with red, and the other with white tubers. The red tubers are accounted the best. When Potatoes are not procurable, they serve as a useful substitute, though their sweetness is far from agreeable to most persons.

The tubers may be planted out in June, about a foot and a half apart, in rows, and the crops will be ready for use in the cold season; but it is a vegetable rarely cultivated in gardens, being more suited for a field crop.

On the hills it is not cultivated in gardens, but the hillman plant the tubers in April and May in the warm, moist valleys.

LABIATÆ.

Mentha viridis.

MINT—SPEARMINT.

Podeena.

The Mint of this country appears to be a different variety, if not a different species, from the well-known herb of that name of the English gardens. The Indian Mint has a roundish crimped leaf, not longer than broad; very deficient in flavour, especially when cooked. The true English Spearmint has leaves comparatively smooth, and, as its name denotes, lance-shaped, more than twice as long as broad. The herb loses in course of time the full strength of scent and flavour which it possesses when grown in the hills, and becomes no better for culinary use than the common Indian kind.

The plant is most easily propagated by division of the roots. Every sprig nearly will strike, if planted in a damp, shady situation.

On the hills, sow the seed in April.

Mentha piperita.

PEPPERMINT.

Peppermint in habit and appearance much resembles common Mint. It thrives well in this country, delighting in a good soil and a shady situation. It is easily propagated in the cold season by setting out in the ground sprigs, pulled off from the plants, with a small portion of root attached to them, and keeping them well watered and shaded till thoroughly established.

On the hills, sow the seed in April.

Meriandra Bengalensis.

BENGAL SAGE.

This herb is in general use in Lower Bengal for culinary purposes under the name of Sage, for which, however, it is rather an indifferent substitute. It has much larger leaves, but its appearance is sufficiently similar to lead a casual observer to mistake it for the true Sage of the English gardens. It is easily propagated by division of the roots.

Salvia officinalis.

SAGE.

The true Sage of European gardens is in the climate of India a very delicate plant, and can be kept alive through the hot and rain seasons only with great care. Dr. Voigt states that the Sage plant was introduced into the Calcutta Botanical Gardens in 1809, and that during the five subsequent years it never flowered.

It is easily raised from seed in the cold season. The sowing had better not be made before November, or the young seedlings will be nearly sure to damp off and perish. The sowing, moreover, is best made in the open ground in a well-manured soil, protected from sun and rain by a matting supported on a bamboo frame. When the plants have four or six leaves, they may be thinned out to four inches apart and the matting removed. By the end of February, they must be transferred to some spot sheltered from the full power of the sun, and protected likewise from heavy rain, or they will be sure to die.

There is, however, so much difficulty in keeping them through the hot and rain seasons, that the best plan perhaps is to raise a large number of plants in the cold season, and when they are in full vigour, just upon the approach of the hot season, to pull them up and pluck off the leaves, and having carefully dried them, store them away in well-corked bottles for future use.

On the hills, sow in March and April.

Origanum vulgare.

MARJORAM.

Marjoram is a herb of very little value, I believe, for use in the kitchen. It grows well in the open ground all the year through, and requires little or no attention bestowed upon its cultivation. It is best, however, to renew it annually in October, which may be easily done either from seed or by dividing and putting out in fresh ground the roots of the old plants.

On the hills, sow in March and April.

Thymus Serpyllum.

THYME.

Dr. Voigt states that this herb continued in existence in the Calcutta Botanical Gardens for a period of more than twenty years without blossoming. I have, however, experienced the greatest difficulty in keeping it alive even through a single hot and rain season, and have come to the conclusion that the best method of obtaining a supply of it for domestic purposes is to treat it in the same manner as recommended for Sage, that is: Sow the seed of it annually in October, and on the approach of the following hot season, gather all the leaves from the young plants, dry them well, but not in the sun, and then keep them in well-corked bottles for use when required.

On the hills, sow in March and April.

ASTERACEÆ.

Helianthus tuberosus.

JERUSALEM ARTICHOKE.

This delicious vegetable is cultivated successfully in most parts of India. The tuberous roots are the parts used for the table, and are in season in November. The ordinary soil of the garden generally suits it without the addition of much manure. The tubers are put into the ground in May, in rows about a foot and a half apart, and with the same distance between each plant, and three inches deep. The plants grow to three or four feet high, and produce their Sunflower-like blossoms in abundance; these possibly it would be of considerable advantage to remove before opening. The tubers are fit for use by November.

When the tubers are taken up, they should be stored away in large flower-pots, well covered in with earth, or they will be liable to shrink and shrivel from exposure to the air.

I have not met with this vegetable commonly cultivated on the hills. But tubers put down in April will grow vigorously and yield a plentiful crop in August.

Cynara Scolymus.

ARTICHOKE.

Hâthichuk.

This vegetable is, I believe, better known and more generally cultivated in India than it is in England. Probably *it* is from the

very large space the plants take up that they are so seldom seen in ordinary English gardens.

Any time from the end of July to the beginning of September is suitable for sowing the seed, which usually germinates in about ten or twelve days after being sown. The sowing should be made in gumlahs under shelter from the rain, but exposed as much as possible to the light, otherwise the young seedlings are very apt to damp off.

The plants bear a long tap-root, which is liable to become broken if allowed to grow large before being transplanted. They are best planted out when about a hand high at a distance of three feet apart at least. Like all other vegetables, they thrive best in a rich soil. I have heard elephant's dung recommended as a manure, and have known instances where it has been liberally applied, but as far as I could learn, with no marked advantage. Sea-weed is the manure which, when obtainable, is said to suit them best, and in default of that any manure in which salt is an ingredient. Saltpetre is a very good manure. The plants require to be grown in open unshaded ground, which it is desirable should be changed each season. They come into bearing towards the end of February. Some few will survive through the hot and rain seasons, at the close of which they should be dressed with a liberal supply of manure. These will be productive considerably earlier than those raised fresh from seed. Plants, however, raised fresh from seed produce far superior heads.

In the Upper Provinces plants raised from American or European seed prove abundantly productive of fine large heads during the months of March, April, and May. But in the neighbourhood of Calcutta, only what is called acclimated seed can be used with any prospect of success, as it is very rare indeed that a single head can be obtained from plants raised from imported seed. Nor have I seen any advantage in preserving plants, that have proved unproductive the season they were raised, until the succeeding one, for I have found them continue as barren then as they were at the first. Continual shifting of the plants, when young, has been recommended in order to promote fruitfulness. I have tried this plan, but with no success.

Those who have once become possessed of acclimated seed can of course secure a succession of it from year to year by reserving a few of the earliest-formed heads for ripening.

CHARD.—A name given to the young offsets of the Artichoke when submitted to the same mode of cultivation as the Cardoon.

On the hills, the seed should be sown in March and April. When plants are once established, they last out the winter with a little protection, and go on yielding a plentiful crop of very superior heads for three or four years.

Cynara cardunculus.

CARDOON.

Between this vegetable and the Artichoke there is scarcely a perceptible difference, but the mode of cultivation is altogether different. It is not much cultivated anywhere, and seems to be hardly known in India.

The seeds are sown at the same time and in the same manner as those of the Artichoke. When the young plants are about nine inches high, they are put out at a distance of three feet apart in ground that has been well enriched with manure. They are then treated much in the same way as Celery. When the vegetable has become blanched by being earthed up, it is ready for use, and is taken up and stewed like Seakale.

On the hills, same cultivation as for Artichoke.

Cichorium Endivia.

ENDIVE.

There are two principal varieties of this vegetable, the Batavian, or broad-leaved, often used for stews, and the curled, called sometimes Capuchin's Beard, used as a garniture for salads.

The seed should be sown in the middle of October, broadcast and very thinly, in good soil. The young plants should be thinned out to twelve inches apart. They do not bear transplanting well. Those prove finest which are allowed to remain unmoved.

When the plants have completed their growth, they should be blanched by being tied up in the form of a cone with bandages of Plaintain-leaf fibre.

On the hills, sow in March and April.

Leontodon taraxicum.

DANDELION.

A thick-leaved variety of this plant has recently been produced in France, and is now elevated to a place among vegetables for the salad. It is cultivated much in the same way as Endive, and the leaves are eaten either blanched or green.

Tragopogon porrifolius.

SALSIFY.

A solitary bundle or so of this vegetable is usually exhibited at the Calcutta shows; but it is not much cultivated in India. In England it is in very little request, and to many persons scarcely known. The root is the part eaten, and is when ready about three months from the time of sowing, of the thickness of a man's forefinger, and nine inches long.

The seed should be sown when the rains are over, either broadcast or in drills eight inches apart. The plants in the drills must be thinned out to four inches apart, and frequently watered. They require a soil that has been previously well dug up, and then lightened with a mixture of well-decayed manure and silver-sand or ashes.

The seeds imported from England are very uncertain of germinating. The best plan, therefore, is to allow as many of the plants to run to seed as will supply a sufficiency for sowing the following season. The vegetable would probably suffer no deterioration by adopting this plan, as it is not one of those that have been brought to high condition by cultivation.

The Americans call it the Oyster-plant, from the fancied resemblance of its flavour to that of an oyster. As the mode of dressing it may not generally be known, I subjoin the following :—

"Having scraped the Salsify roots and washed them in cold water, parboil them, then take them out, cut them into large pieces, and fry them in butter.

"Salsify is frequently stewed slowly till quite tender, and then served up with melted butter. Or it may be first boiled, then grated, and made into cakes to be fried in butter.

"Salsify must not be left exposed to the air, or it will turn blackish."*

On the hills, sow the seed in March and April.

Scorzonera Hispanica.

SCORZONERA.

This vegetable requires the same mode of cultivation as Salsify, to which in most respects it is very similar, except that it has broader leaves, and that the roots are black and require to be scraped before being cooked. In Europe it is not considered fit for the table till the

* Miss Leslie's 'Cookery Book,' p. 195.

second year of its growth. In my garden at Chinsurah it continued in a thriving condition through the hot and rain seasons, and produced its handsome lavender-coloured flowers in September.

On the hills, sow in March and April, and treat same as Salsify.

Lactuca sativa.

LETTUCE.

Salâd.

There are two kinds of Lettuce, the Cabbage-lettuce and the long upright kind called the Cos-lettuce. It is a matter of taste which of these two is to be preferred. For sweetness and tenderness the Cos, when in perfection, will perhaps be the favourite. This kind affords also a very delicious dish when stewed. Of the two kinds, moreover, there are several varieties, many of which possibly are excellent, when seed is obtained true to its name. Of the Cos kind I have never seen any very favourable specimens in this country, except those I have raised of the variety called Carter's Giant White. There is no vegetable of which the cultivator should be more careful about obtaining superior seed than the Lettuce. For the cold season crops country seed should be entirely rejected, and none but that of European produce sown.

A commencement of sowing may be made at the beginning of October. The seed is rather small, and in some cases will be in the ground perhaps a month or two before the whole that has been sown germinates. It is very liable to the depredations of insects, of the red ants in particular, which devour it greedily; it is therefore a good plan to make the sowing in a large shallow seed-pan, and isolate this by placing it upon an empty flower-pot standing in a vessel of water. Another seed-pan of equal size inverted upon the one in which the sowing is made will keep the soil from drying too rapidly. The soil used should be made light and mellow by mixing with it leaf-mould and a little sand.

The plants should be pricked out as soon as they have made their second pair of leaves, and planted out, at about eight or ten inches apart, in a piece of ground of a light rich soil.

When plentiful, the seed may also be sown broadcast in the open ground: those will be by far the finest Lettuces which grow up on the spot where sown, as they always suffer more or less from transplantation.

If two or three plants be reserved and allowed to run to seed, the seed thus saved may be sown almost immediately, and a supply of

plants secured, which, if grown in a spot tolerably sheltered from the sun and excessive wet, will come into use during the hot and rain seasons.

On the hills, begin sowing from March, and go on sowing successively every 15 days till September. The seeds should invariably be sown in pans, and the seedlings pricked out into beds when the fourth leaf has formed.

APIACEÆ.

Apium Graveolens.

CELERY.

Of this vegetable there are two principal kinds, the white and the red; of each of these there are also several varieties. The red varieties in this country are of larger growth, and produce firmer and denser heads than the white; but the white, when raised from good seed and well cultivated, are by no means inferior.

The perfection to which Celery may be brought depends, unquestionably, in a great measure on the quality of the seed. I have seen no finer specimens of Celery in India than those for which my mâlee gained the bronze medal and first prize at the Calcutta Horticultural shows. They were of Cole's Solid Red and Crystal White. Another kind, also, which with me has proved of great excellence, is the Incomparable Dwarf White.

Celery takes a long time to complete its growth in; sowings, therefore, may be made as early as the beginning of August. The seed, however, which at a later and more congenial season germinates in about twelve days, at this early period may be expected to come up not until, perhaps, six weeks or two months after sown, and then only partially. It should be sown in gumlahs in a light soil, and if the seedlings come up too thickly, they should be pricked out to about two inches apart, and remain till they become strong, healthy plants, three or four inches high, before being removed to their places in the open ground.

The usual mode of preparing the ground for the young plants is to dig trenches eighteen inches deep, and as many wide. The trenches are then filled up with a compost of two parts of well-decayed cow-manure to one part of common earth, to the height of nine inches. In these trenches the young plants are put eighteen inches apart. They are then kept frequently watered, and about once a week supplied with liquid manure. Saline manure is said to be highly beneficial, and to tend to make the vegetable crisp.

Most cultivators commence the process of blanching by earthing up the stems at a very early period, and continuing to do so till the vegetable is taken up for use. One method often employed is to take a piece of large bamboo eighteen inches long, and slit it in two: and having pointed the ends, drive them into the earth, one close on each side of the Celery plant. The plant thus encompassed by the bamboo is earthed up. Some place earthenware nuls over the plants for the same purpose.

But with the adoption of either of these plans, the plants are very apt to decay. Sir J. Paxton says that earthing up much impedes the growth of the plants, and that they should be allowed to grow to maturity before this is resorted to, when it takes about a fortnight to blanch them. I have myself acted upon this statement, and found it result both in great advantage to the plants and in the saving of a vast deal of trouble to the mâlee.

A more economical mode of proceeding, and one that I have uniformly practised myself, is to dig a row of circular holes in the ground nine inches in diameter, a foot deep, and six inches apart. Fill these with soil, well enriched with manure, to within three inches of the top. Put one young plant in each, and then proceed with the cultivation as above directed.

Celery takes about six months from the time of the seed germinating to attain its full size; but for the table I consider it preferable when taken up after about five months' growth. In my opinion nothing whatever is gained by the attempt to grow Celery of an extraordinary size; as the great chance is that when the vegetable is taken up it will be found overgrown, unsound, and perhaps worthless. Or if this be not the case, at least so much of the outer leaves will have to be cut away as coarse and uneatable as to reduce the size to what it was a month previous, when the whole plant would have been found perfectly sound and of far finer flavour.

Celery may be grown in India quite equal in quality, though not, perhaps, in size, to any raised in Europe.

For a succession crop a second sowing may be made about a month after the first. The first sowing, however, will generally supply as many plants as are required for the season.

On account of the uncertainty attending the germination of seed sown in August, some cultivators raise their seedlings at the close of one cold season and keep them on through the hot and rain months, to plant out early at the commencement of the following. This, however, I believe is almost needless trouble.

On the hills, the first sowing should be made as early as the middle of February, in a seed pan with bottom heat. The seedlings should be pricked out into other pans and kept under glass till the

last week in March, when they should be planted out in prepared beds, and afterwards treated as recommended for the plains. Successive sowings may be made in April, May, and June, the seedlings from which can be planted out at once into their prepared beds.

Apium graveolens, *var.* Rapaceum.

CELERIAC—TURNIP-ROOTED CELERY.

A variety of Celery, of which the part eaten is the root, developed by cultivation to a very large size, and having then a very agreeable, filbert-like flavour.

It is cultivated in the same way as Celery, except that no earthing-up for blanching is resorted to. The plants delight in a great abundance of water. Few persons, however, will perhaps be induced to cultivate it, as it entails nearly the same amount of trouble as Celery, to which on the whole it will generally be considered inferior.

Petroselinum sativum.

PARSLEY.

Peetercelee.

Parsley-seed may be sown about the middle of September in gumlahs, placed somewhere under shelter from the heavy rains. The seed germinates in about ten days. When the plants are three or four inches high, they may be planted out in a row, about half a foot apart, in a shady place, and kept well watered.

About March the plants will yield seed, some of which should be stored away, and some sown immediately for a fresh supply of plants for use during the hot and rain seasons.

On the hills, sow from March to September.

Fœniculum officinale.

FENNEL.

This herb thrives well in Bengal, and where it has been once grown will come up each cold season afterwards from seed self-sown. No particular care is required in the cultivation of it; there is, however, so very little use to which it can be applied in cookery, that it scarcely merits a place in the garden. Sow the seed in October on the plains, and in March and April on the hills.

Pastinaca sativa.

PARSNIP.

This vegetable is not well known in India. It is said that the seed, if more than a twelve month old, rarely germinates; and as the seed imported to this country must of necessity be older than that, there need be little surprise that it commonly fails.

The mode of cultivation would be precisely the same as practised with the Carrot. But the Parsnip takes much longer time in becoming mature for table use, and indeed requires the effects of an English winter to bring it to perfection. Under these drawbacks, perhaps few would care to attempt the cultivation of it in this country.

On the hills, sow in March.

Daucus Carota.

CARROT.

Gâjur.

There are two very distinct kinds of Carrot: the long-rooted, comprising the Long Surrey, Altringham, and Long Orange; and the Horn kind, of a blunt spindle form, and not going down far into the earth. These latter are the more easily cultivated, come into season earlier, and are tender and of a mild flavour; but the long-rooted, in my opinion, have more of the true Carrot taste, and are the preferable vegetable.

Sowing may be commenced about the middle of October, when the rains are over. A good, loose, and deeply-dug soil is desirable for every kind of Carrot, but not so indispensable for the short or early Horn as for others. The seed is more commonly sown broadcast, but the better and more economical plan is to sow it in drills. The drills should be in rows, eight inches apart. If the seed be mixed, and rubbed together with a little sand, the sowing may be managed much more easily. The plants when they come up in the drills should be hoed out to six inches apart. As they make growth, the ground should be well watered to enable the roots to penetrate into the earth, but a soil over-enriched with fresh manure is said to give the roots a tendency to fork.

Carrots, when they have attained to a size fit for table use, may be taken up and stored in large earthen vessels, filled up with well-dried earth closely pressed down. Before taking up the Carrots, it is well to cut away the green leaves down to the crown, so as to allow the tops of the roots to dry a day or two in the sun.

On the hills the early varieties should be sown, in a sheltered situation, as early as February. Successive sowings may be made from March to September every 15 days. They are best sown broadcast.

PART III.
THE FRUIT GARDEN.

PART III.

THE FRUIT GARDEN.

HOW TO LAY OUT AND STOCK IT.

THERE are few gardens in India where any attempt is made at a systematic cultivation of the choice kinds of fruit trees. The generality of Indian fruit trees are of large growth, many of the most esteemed being lofty forest trees. This circumstance in itself will account for the want of systematic cultivation I have noted. It would, indeed, be impossible to devote any particular part of the garden exclusively to fruit trees for this reason, as they would require and take up far too much room than could conveniently be spared in fairly large sized private gardens. It is quite a different matter in the case of large public gardens, where this is possible; but with, perhaps, one or two exceptions, very little attention is given to the exclusive and separate cultivation of fruit trees in all the public gardens that I have visited in this country. There is no method or style adopted in planting fruit trees. Usually they are planted along walks, in straight lines;—sometimes—as in the case of Oranges in some gardens in Upper India, a whole block is planted with one species; but this is rare. More often I have seen flowering shrubs, annuals, and roses in a border, with Mango and other fruit trees planted along with them at intervals of five or six feet apart. Under these circumstances it is, I think, only natural that fruits should be produced of inferior quality.

There is perhaps no other country in the world where an orchard judiciously planted would yield better results than in India, and make a handsome return to its owner in the course of a few years. An area of ten or twenty acres of land, which can be had at a low rate, planted exclusively with the choicer kinds of fruit trees, would, in my opinion, be an inheritance worth having, especially in Behar. The marvel is that the thousands of wealthy natives—who do not, as a rule, care much about a flower garden—have not taken up this idea before now.

In the case of Europeans, their unwillingness to lay out money on a fruit garden is easily accounted for from the temporary and migratory

nature of their residence in this country. But to those who possess gardens, and take an interest in fruit culture, I address the following suggestions for laying out a fruit garden :—

In selecting the site secure, if possible, a northern aspect, free from large trees other than fruit trees. There should be a boundary wall of some kind, either a wire fence, a hedge of karunda, or a mud-wall. Along this hedge, wall, or fence, plant the trees of large growth, but common or indifferent fruits, such as Jamun, Rose-Apple, Jack, &c. Then lay out a pathway about eight feet wide, and raised a foot from the level of the ground, all round the garden parallel with the wall and the large fruit trees. On the opposite side of the pathway, at intervals of not less than twelve feet apart, plant trees of lesser growth, such as Guavas, Custard-Apples, Bullock's Heart, Pomeloes, Figs, Lichees, Loquats, &c. The pathway between these two rows of trees will always afford a very pleasant promenade. The rest of the ground should be parcelled out in blocks or squares, divided by pathways eight feet wide. The size and number of these blocks will depend entirely upon the extent of ground. Each block should be planted with distinct species of fruits; for instance, Oranges and Mangoes should not be mixed up. One or two blocks might be devoted to the cultivation of rare fruits. By rare, I mean those that are not commonly grown, or are natives of other countries, such as the Cherimoyer, Mangosteen, &c. By having each species by itself, the plants can be much more conveniently treated. Care should be taken not to plant too closely, which is frequently done to the great detriment of the trees. Assuming that a northern aspect has been selected, the Vinery should, if possible, run the whole length of the orchard, in a straight line through the centre, and the Vines planted in the manner described under the head of "Grape."

In planting fruit trees, it should always be borne in mind that much of ultimate success will depend upon the foundation, so to speak, the plants receive to work upon. In other words, the soil in which they are first planted should be the best suited to them. For this purpose holes should be dug three feet deep and three feet in diameter, and filled with good, rich soil, specially prepared for the purpose. This will be found a little troublesome, as well as expensive, but in the end the results will more than recoup the trouble and expense. These directions will not of course apply to Strawberries, Melons, and Pine-Apples, for which the whole block devoted to each must be dug up and manured and treated as for a field crop.

For an ordinary fairly large-sized private garden, in Calcutta, I recommend the following list of fruit trees, as best adapted for general cultivation :—

1 Mango.
2 Litchee.
3 Plantain.
4 Custard-Apple.

5 Bullock's Heart.	13 Pomeloes.
6 Peach (common).	14 Lemon.
7 Loquat.	15 Cocoanut.
8 Sapota.	16 Strawberry.
9 Guava.	17 Pine-Apple.
10 Jack.	18 Melon.
11 Rose-Apple.	19 Karonda.
12 Spandias, both varieties.	20 Date-Palm.

The above are certain to yield a good return. Other species might also be grown, if only for the sake of novelty.

For gardens in Behar and Upper India, I would add the following to the above list:—

	Orange.	Vine.
Plums.	Pomegranate.	Fig.
Averrhoas.	Nectarine.	Pear.
Apple.	Quince.	Long Plum.

And take away the Cocoanut.

The foregoing directions as to planting apply equally to hill stations, except that a southerly aspect should be selected, where, of course, only a limited number of fruit trees can be successfully cultivated without the warmth and shelter of a glass house. Apples, Pears, Apricots, Plums, Cherries, Strawberries, and Raspberries can be thus grown and brought to perfection by judicious treatment.

In selecting fruit trees, care should be taken to obtain the best varieties only, especially with regard to Mangoes, Guavas, Figs, Oranges, Melons, Grapes, and Strawberries. It is, I consider, a waste of time, labour and expense to stock a fruit garden haphazard.

GENERAL REMARKS.

The fruit trees here described comprise not only those that are met with in ordinary cultivation, but likewise those which, as far as could be ascertained, have been introduced into the country. Many of the latter have proved altogether worthless as regards their produce, and fully realise what has been observed by Baron Humboldt :—

"It is striking to see plants in particular localities grow with the greatest vigour without producing flowers. It is thus with European olive-trees, which have been planted for centuries between the tropic near Quito; and also in the Isle of France with walnut-trees and hazel nuts." *

* 'Aspects of Nature,' p. 134.

Moreover, it is a fact only too well known to all who have cultivated a garden in Lower Bengal, that many fruit trees prove all but utterly unproductive there, which, in other parts of India, produce fruits in abundance and of excellent quality. I need but mention, for example, Apples, Pears, Plums, Figs, Grapes, the China Flat-Peach, and Oranges.

Much possibly might be done towards the improvement of our Indian fruits by skill and contrivance. It remains yet to be ascertained, for instance, whether or not the system, now much practised in Europe, of dwarfing the trees by grafting upon stocks of a different but allied species, might not answer equally well here. The advantages of this practice are that the trees come into bearing much sooner, occupy comparatively little room, and may therefore be cultivated in very small gardens; they are easily manured and root-pruned, and when ripening their fruit may without difficulty be covered by nets to protect them from the ravages of birds.

Attached to the gardens of the Agri-Horticultural Society was a large orchard of fine, vigorous, full-grown Mango-trees of the sorts held in the highest estimation. These trees were almost completely unproductive, and what little fruit they sometimes bore, very indifferent. The grafted plants, however, taken from them, produced in other localities, I am assured, abundance of unexceptionable fruit. This circumstance at once suggests the expediency of trying with fruit trees in this country the method that in like cases has been so successfully carried out in England. The method consists either in biennial transplantation practised from the commencement, or in shortening the roots, cutting them back annually so as to confine them within a ball of certain limited dimensions. By this treatment the trees are kept dwarf, and the roots prevented from going down deep into a soil that does not suit them.

Certain devices are sometimes resorted to in order to render fruit trees productive, as well as to improve the size and quality of the fruit. Each of these, though varying in the means, seems referable to the same principle, that is to say, the obstruction of flow of the sap in its descent from a fruit-bearing bough. One long known and practised in Europe is what is called "Ringing." This consists in either binding the stem round tightly with a ring of strong wire, or of removing entirely a ring of bark, about an eighth of an inch in width, so as to lay the wood beneath bare. Two other devices, said to be attended with the same result, I have only heard of as practised in this country: the one consists in punching out here and there on the stem pieces of the bark: and the other—which my informant assured me rendered trees of his previously barren immediately fertile—consists in driving a large nail into the stem of the tree just below where the branches fork out.

Bearing upon the same object also, I quote a communication I made some time ago to the Agri-Horticultural Society :—*

"The following mode of treating the Lichee was communicated to me by Mr. R. Solano, of Shahabad, about a year ago. He told me the result of it was that the stone of the fruit became much lessened, and the pulp consequently much more abundant, and considerably improved in flavour. At any time during the cold season select a branch that is to be used afterwards for inarching. Split up carefully somewhat less than a span long. From both halves of the branch thus split scoop out cleanly all the pith; then bring the split halves together again, and keep them bandaged till they have become thoroughly united. At the usual time, the beginning of the rains, inarch the branch thus treated upon a suitable stock, taking for the place of union the portion of the branch just below where the split was made. Upon a branch of the tree thus produced a similar operation is performed, and so on in succession, the result being that the stone of the fruit becomes less and less after each successive operation.

"Being unable, as indeed I still am, to conceive on what principle a proceeding like this could have any such effect, as was stated, I must say I felt at first rather incredulous on the subject. Mr. Solano, however, assured me that from having practised it in his own garden, he could bear full testimony to its efficacy. He also informed me that the process had been applied likewise to the Grape-vine at Malaga in Spain, and that plants thereby had at last been produced which bore the finest fruit without the slightest vestige of a stone within them. Subsequently to this, and some little time after my arrival at Gowhatty, the late General F. Jenkins, with his usual liberality, kindly put at my disposal a large manuscript book of notes he had made upon gardening. On reading it through I met with the following, of which I made an extract :—'To prevent the formation of seed in Guavas, take a young tree, split it in the middle with a carving-knife, about 12 or 15 inches up and down; pick up the pith; close it; cover it up with earth, and bind it up with straw. The tree will grow as before, but the fruit will have no seeds in them.'

"The General told me he had never tried the process himself, and could not therefore testify as to its merits; nor could he remember where he had learnt it."

It may be added here that this process is extensively practised by Kabuli gardeners for producing their *Bedána* (or seedless) grapes and pomegranates, so commonly met with in India when brought down annually by Kabuli itinerant fruit dealers.

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* Dec. 19, 1866.

Where fruit trees bear over abundantly, it is well to what is called "thin-out." This consists in pinching off a very large portion of the young fruit soon after it is formed, or, better still, the blossom-buds before they expand. The fruit that is left is thus rendered much finer in size and quality, and the productiveness of the tree on the following year is not impaired, as it otherwise would be. The practice, however, though often in Europe considered indispensable, is seldom if ever adopted in India.

PALMACEÆ.

Borasus flabelliformis.

PALMYRA-TREE—FAN-PALM.

Tâl gachh.

This well-known Palm is about the commonest tree we have in Bengal. It produces in the cold season a crop of great round black fruits, the interior of which consists of an insipid, gelatinous, pellucid kind of pulp, about the size of a child's head, eaten by the natives, but not likely to be at all acceptable to Europeans; but a good preserve, it is said, may be made of it, and when of about the size of a fowl's egg it is often used for pickling.

The undeveloped seed kernel is the most delicious part of it, and as it is sold in large quantities in the bazars during the hot, dry months of April and May, it is most acceptable, being very refreshing and cool.

Phœnix dactylifera.

DATE-PALM.

Khajoor.

The Date-tree abounds in nearly all parts of the country, but the Arabian variety does not thrive in Bengal. Through the untiring zeal of Dr. E. Bonavia, it has been imported in the shape of seed and offsets from the Persian Gulf into nearly all parts of India suited to it, especially in the N.-W. Provinces, the Punjab, Mysore, Sind, Bombay, and Rajputana, in all of which places, it has succeeded admirably, and promises at no distant date, to become one of the

most inportant elements of the food-supply of the country during seasons of drought, famine or scarcity. In Bengal, although the Arabian variety, as well as the common country, or wild date, Phœnix sylvestris, grow vigorously enough, the produce is of the very poorest description.

Indeed, the tree appears to be cultivated more for the sake of its juice, which is drunk in the shape of toddy, than for its fruit, in Lower Bengal. A small pamphlet has been published by Dr. Bonavia on the cultivation of the Arabian Date-tree in India, which contains every information on the subject. They should be planted in groves, 16 feet apart. The tree is easily raised from seed, and may be propagated also by offsets. A saline soil suits it best. Saltpetre has a good effect. Both salt and saltpetre should be added to the soil in which the Arabian variety is planted. Plants and seeds, true to name, can be had from the horticultural gardens, Lucknow, and the Government Botanical Gardens, Saharunpore.

BROMELIACEÆ.

Ananassa sativa.

PINE-APPLE.

Ananâs.

The Pine-apple, introduced originally from South America, has long ago become all but naturalised in the lower parts of India. It is grown in vast abundance about Calcutta, but whether it be that, with the exception of the Cayenne, we have not there any of the established European varieties of this most delicious fruit, or whether sufficient attention has not been given to the cultivation of the kinds we have, it is certain that the fruit produced in this country is not to be compared for flavour to that raised in the hot-houses at home.

1. The Bengal kind is not by any means an indifferent fruit when grown in a situation exposed to the sun. The large insipid fruits sold in such quantities in the bazars are nearly all produced under the shade of trees, in out-of-the-way places, the shade conducing as much perhaps to the size as it tends to detract from the flavour. The following are the varieties issued from the Gardens of the Agri-Horticultural Society :—

2. The *Ceylon*, introduced originally by Mr. Robinson, is decided to be the finest in flavour of all. The fruit is rather large, greenish when young, and of an orange colour when ripe.

3. The *Sylhet*, or *Koomlah*, is a small fruit, compact in form, of very high reputation; when young of a black colour, and bright yellow when ripe. It is peculiar, too, for the very large size of its eyes, and for not having more than seven or eight of them.

4. The *Dacca:* also a fine fruit, remarkable for the smoothness of its rind and white colour of its eyes.

5. The *Penang:* one or two sorts introduced from Penang differ but little from the ordinary Bengal kind.

6. *Conical-crown:* a variety of curious long sugar-loaf form, but of no particular excellence.

7. *Striatifolia:* a variety I believe from Java. With its merits I am unacquainted, as it is unproductive here. The beauty of its leaves, striped with red and white, seems to be its principal recommendation.

8. *Cayenne:* a variety much cultivated in Europe, where it is in high estimation, and where it is accounted the best kind for winter fruiting. There are two sub-varieties, the Smooth and the Prickly. The one we have was introduced in 1860 from Peridenia in Ceylon; is remarkable for the deep verdant green of its leaves, and for their being almost entirely divested of spines. It has not fruited here yet.

9. *Moscow;* 10. *Queen:* Mr. L. Berkeley informed me that he had imported these two varieties from Europe, and that the former had fruited in his glass-house at Lahore.

The Pine-apple flowers in February and March, and ripens its fruit in July and August. After which, in September and October, it makes its principal growth. It sometimes, however, happens that plants, instead of making growth then, break into flower, and so produce fruit in the cold months. This is by no means desirable, as the fruit produced thus unseasonably is, from want of heat sufficient to ripen it, almost invariably acid and uneatable. Young shoots and suckers not required should be removed from the plants as soon as they make their appearance.

After the rains, no water need be given them till they have set their fruit in February and March, when, as well as during all the time that the fruit is swelling, it should be bestowed abundantly. It is important also that at the same time the leaves should be well cleansed by occasional drenchings from above, in order to remove the dirt and dust that would otherwise clog their pores, and so impede the passing off duly of the water they imbibe at their roots.

The proper season for planting out Pine-apples, as will be easily understood from the above, is in August. A situation should be chosen for them where they may be fully exposed to the sun. They should be placed in rows, at a distance of three feet at least between each row, and at a distance of two feet from each other in the row.

A writer in the 'Gardeners' Chronicle' states that for soil, "a compost of two parts of mellow turfy loam to one of strong turfy peat, with a liberal sprinkling of clean, sharp sand, and some crushed, or broken bones, will be found to answer perfectly."* A writer again in the 'Gardeners' Magazine,' vol. ix,† directs that "at all events the soil must be rich—it scarcely can be too rich: the Pine-apple is a gross feeder, and will thrive in vegetable manure, however rich and fresh." In accordance with the latter writer Mr. Speede also states that for the cultivation of the Pine-apple in this country "no soil can be too rich and no manure too strong." He directs that in February the roots should be opened, and a basket of rotten dung be given to each plant, and above that the like quantity of fresh stable-dung with litter, and over this a thin layer of earth. Dig a trench from each end of the plants, and fill it every day with water. Water overhead with watering-pot once a week over leaves and fruit. "In this way," Mr. Speede asserts, "Pines may be obtained as large and fine-flavoured as in any part of the world." I cannot say that I have been very successful in the adoption of this plan, having found my plants inclined to rot and perish from an over-supply of manure. A soil thoroughly lightened with leaf-mould, well-decayed cow-dung and sand, may be relied upon, I believe, as that in which they will thrive to perfection.

But one point, which must be insisted upon as of great importance, is that the plants be removed after comparatively short periods into an entirely new soil. This is a fact that seems not by any means commonly recognised; still it accords with what I find in the MSS. notes of the late General Jenkins, as the "cultivation recommended by a native of Dacca. Let the soil be ploughed and well cultivated, and the plants be planted on it. After the lapse of a year, let the old trees be extirpated, and the smaller plants be transplanted from their places. The oftener the plants are transplanted, the more will their growth and quality be improved."

Very similar in effect to the above is the mode of proceeding prescribed by French horticulturists. M. Ysabeau writes: "The Pine-apple is subjected to a treatment which few other plants could endure, the constant success of which goes to show how essentially robust its constitution must be. All the roots of the plant are cut off clean at the collar, and the Pine-apple, after the wound has been well dried in the open air, is inserted in a large pot of prepared soil, some of the lower leaves having been first removed."‡ In 'Le Bon Jardinier' it is said that "the plants should be thus treated in October, and that in three weeks they will have made new roots." ¶

* May 10, 1862. † Quoted from the 'Encyclopædia Britannica.'
‡ 'Le Jardinier de tout le Monde,' p. 327.
¶ 'Le Bon Jardinier' pour 1866, p. 417.

The Pine-apple, it is said, is much improved by having the leafy crown of the fruit twisted out when about four inches in height, and a piece of tile laid upon the top. General Jenkins states likewise that "the Bengalee mâlees force their Pines by cutting off the crowns when they are nearly full grown, but this *they* say takes away their flavour." Such too I should certainly expect would be the result. The General, moreover, adds : "When Pine-apples are gathered they should have their crowns plucked out, which tends to ripen them quickly, and then to increase their flavour; as the crown draws its nourishment at that time entirely from the fruit."

Dr. Lindley states that Pine-apple plants "are capable of existing in a dry, hot air, without contact with the earth, on which account they are favourites in South American gardens, where they are suspended in the buildings or hung to the balustrades of the balconies, situations in which they flower abundantly, filling the air with fragrance."* I have never been able to detect the slightest odour emitted from the plants when in blossom in this country. Dr. Jameson states that "the Pine-apple fruits occasionally at Saharunpore." It is, however, not commonly met with in the North-West Provinces; though with proper management under glass there appears no reason why it should not be raised in as high perfection there as elsewhere.

Plants are propagated most readily during the rains by striking suckers or the green crowns from the fruit in sand. Dr. Lindley also remarks that, "instead of throwing away the stump of a Pine-apple, it should be placed in a damp pit, when the latent eyes will spring forth, and a crop of young plants be the result."†

On the hills it is impossible to cultivate the Pine-apple, except under glass, with the temperature of a stove. There are few, I believe, who would care to go to the expense of erecting a Pinery when the fruit can be purchased in large quantities in the bazar at a comparatively moderate cost. It is imported from Calcutta to the hill stations.

MUSACEÆ.

Musa.

PLANTAIN—BANÂNA.

Kêla.

By some the Plantain and Banâna are considered as two distinct species; but it has now been decided to a certainty, I believe, that the

* 'Vegetable Kingdom,' p. 147. † 'Theory of Horticulture,' p. 302.

latter may be regarded as merely a variety of M. sapientum. The name Banâna is rarely, if ever, used in this country; but all kinds indiscriminately are termed Plantains. Dr. Voigt says: "The numerous varieties of Plantain we have in vain tried to put into some order." But this is a matter of little importance to the horticulturist, as there are, in Bengal, at least, only a few, and those very distinct and marked kinds, which are worth cultivating in the garden.

Sir J. Paxton states that "the plants which have fruited in England have been uniformly insipid or nearly tasteless, which indeed is almost the general character given them by Europeans, even by many of those who have eaten them in the tropics."* This, no doubt, is the true character of the inferior kinds, of which immense quantities are grown in this country, and which possibly are the only ones which many Europeans who come here ever taste. But most unquestionably there is not a more delicious fruit in the world than that of some of the finer sorts described below.

The Plantain delights in a very rich soil. Plants should be put out six or eight feet apart in a trench, about a foot or more deep and three feet wide, which should be well supplied from time to time with fresh cow-dung, and abundantly watered. There should not be allowed to remain more than three stems to each plant, and the suckers, which will be constantly springing up, should be removed as soon as they make their appearance. The stem that has once borne fruit should be cut down close to the ground, as it will never bear a second time, and a fresh sucker should be allowed to grow up to replace it. The Plantain, however, as it appears to me, soon wears out the soil in which it grows, and is immensely benefited, I consider, by removal about every two or three years into entirely new ground.

The fruit should not be gathered until two or three of the uppermost on the bunch have ripened. The bunch should then be cut down, and hung up by a chord in the house, where in a few days the rest on the bunch will gradually ripen. The Plantain is in the last stage of ripeness before it attains to the perfection of its flavour.

A curious notion is prevalent among the natives, that the Plantain may be made to bear two or more kinds of fruit upon the same bunch. This result they affirm is brought to pass as follows: A young sucker is dug up from each of two kinds of Plantain. The suckers must be as near as possible of the same size. These are split up cleanly in half with a sharp knife. A half of one of the kinds is then applied and closely bound to a half of the other kind and then planted in the ground in the

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* 'Magazine of Botany,' vol. iv, 54.

ordinary way. These halves will soon unite, and form one plant, which eventually will throw up a stem bearing two kinds of fruit.

There is little probability of obtaining good fruit from cultivating them so far north as the Punjab, as the frost cuts down the plants in the cold season, and they only recover themselves, so as to begin to bear fruit, when the cold season comes round again, and they are unable to mature it.

Musa sapientum.

Of this the varieties cultivated in the vicinity of Calcutta are :—

1. *Chumpa :* This, in my estimation, is decidedly the finest of all the Plantains, rivalling in lusciousness and delicacy of flavour the most delicious Pear.

The plant is easily recognised by the pervading tinge of red on the stem, and more particularly by the redness of the great central rib of the leaf, both on the upper and under-side. The fruit is about six inches long, ripens of a pale straw colour, and is not fit to be eaten till it can be removed from the bunch without the slightest effort.

2. *Cheenee Chumpa :* differs only from the preceding in being a much smaller fruit—not much larger than a man's thumb. It is borne in large, densely compact bunches.

3. *Martaban :* also a very delicious fruit; in flavour considered by some as equal to the Chumpa, which in size and colour it much resembles. The plant is known by the rib of the leaf being devoid of red both above and below, and by its rim, particularly at the base, having a slight border of reddish-brown, which becomes larger and more prominent upon the sharp upper edges of the footstalk.

4. *Daccâe,* or *Daccâe-Martaban,* as sometimes called by the natives, possesses a flavour surpassingly rich and luscious, and quite distinct from that of the preceding.

The plant bears a strong resemblance to the Martaban, but is at once distinguished from it by the red border upon the upper edges of the footstalk being three times as broad; as well as, more especially, by the large quantity of lime-like powder coating the stem and under-side of the leaves. The fruit is about four inches long, and about half as broad as long, with a very thick rind. It ripens of a pale yellow, the tip and stout stalk remaining of a bright green. This fruit, unlike the Chumpa, remains firm and tight on the bunch when fully ripe.

5. *Kuntêla.* This is a very inferior fruit, of pithy consistency and insipid flavour, though the one cultivated the most extensively of all, and sold in great quantities in the bazars. The cause of the very great demand there exists for this particular kind among the natives

is on account of its being employed in offerings to Seeva, being the only sort, too, they think right to use for that purpose. The inferiority of its flavour as a fruit, moreover, is of little concern to them, as it is principally in its immature state for cooking in curries that this Plantain is consumed. The head of the flowers, likewise, before the sheath in which they are enclosed expands, is often cut off, being esteemed a most delicate vegetable. The plant is distinguished by the pure rich green of the leaves and footstalks, darker than that of the Kutch Kêla. It grows to a great height. The fruit resembles in appearance the Martaban.

6. *Kutch Kêla:* a fruit of great size, used only in its unripe state by the natives for their curries. When boiled it has somewhat of the flavour of the Parsnip, and is a nice vegetable to eat with roast meat. The plant is known by the pervading rich yellowish green of the leaves, being quite devoid of any tinge of red.

7. *Mâhl-bhôg*, or *Mohun-bhôg*, is to my thinking a fruit not much superior to the Kuntêla, which it somewhat resembles, though in very high estimation with some.

Musa rubra.

Ram Kêla.

When in good condition a remarkably fine fruit, much resembling in flavour and buttery consistency the Daccâe.

The plant is unmistakeable at a glance, having its stem and footstalks and midribs of the leaves of a dull red colour. The flowers are also of the same colour.

The fruit, which is about seven inches long and rather thin, at first of a very dark red, ripens of a yellowish red. This kind is not very common.

Musa Chinensis.

CAVENDISH PLANTAIN.

A very delicious Plantain, of rich and peculiar flavour.

The plant may be recognised in a moment by its dwarf and compact form, not growing to above half the height that other kinds do, and bearing very large, wide, thick, dark-green leaves, which lie closely one upon the other. The fruit is borne in enormous bunches, is about ten inches long, of moderate and uniform thickness, and ripens of a pea-green colour. It is exceedingly difficult to obtain in perfection, as it is uneatable till quite ripe, and on its becoming ripe commences almost

immediately to decay. Its English name was given it by Sir J. Paxton, in honour of the Duke of Devonshire.

Musa Arakanensis.

ARRACAN PLANTAIN.

On sending plants of this species to the Agri-Horticultural Society some years ago, Captain Ripley observed: "If well manured the fruit of this tree is one of the best Plantains there is; the old trees yield particularly fine fruit."

Arracan seems to be especially rich in the variety of Plantains it produces, for, besides the above, Captain Ripley sent to the Society in September of 1857 as many as eighteen kinds, of eleven of which he wrote in high commendation. But whether from inattention, or from their being unsuited to the climate, I found, on inquiry in 1861, that the whole had perished. I subjoin the names, with Captain Ripley's remarks:—

1. *Hpeegyan:* has a thick rind of a darkish brown, is a very pleasant fruit, being of a mellow sub-acid flavour.
2. *Thenasia:* a small-sized fruit, but of excellent flavour.
3. *Beela:* a good Plantain.
4. *Nathaboo:* this is a very luscious fruit.
5. *Byat Taus:* is a large, well-flavoured fruit.
6. *Gyeeswé:* the Hog-deer's Tooth, is a long thin Plantain of good flavour.
7. *Moungbya:* is much liked; it has a pleasant sub-acid flavour. The skin is of a dead white, and very thick.
8. *Peemwé:* also a sweet, well-flavoured fruit.
9. *Wet Tsway:* the Boar's Tusk. Is an excellent-flavoured, handsome fruit.
10. *May dauletthé:* a long narrow Plantain, growing in handsome bunches, with a luscious fruit.
11. *Mounqore:* a thick-skinned Plantain of good flavour.

Musa Africana.—A late introduction, with the merits of which I am unacquainted.

The Plantain cannot be grown on the hills.

ORONTIACEÆ.

Monstera.

M. deliciosa.—Native of Mexico; described as a climbing plant, producing its flowers in a spathe, and bearing a succulent fruit with a

luscious Pine-apple flavour: lately introduced, but with what success I am unaware.

ELÆAGNACEÆ.

Elæagnus conferta.

OLEASTER—WILD OLIVE.

The fruit of this tree is of the form and size of a Damson, has a stone in the centre, and when ripe is of a pale red or cherry colour. It is very acid, and though not generally considered an edible fruit, when cooked and sweetened with sugar makes a very agreeable compote. It would, I have no doubt, answer excellently for preserving. The tree flowers in the cold season, and the fruit ripens about the middle of February or beginning of March, and is borne usually in great profusion. The plant, which is a large scandent shrub, of ornamental character from the silvery appearance of the under-surface of its leaves, is easily propagated by seed sown in October.

MORACEÆ.

Morus nigra.

MULBERRY.

The Mulberry of the English gardens, said to be a native of Persia, was introduced into this country many years ago; but, as far as I can ascertain, has never been productive. Dr. Voigt states that for a period of nineteen years plants in the Calcutta Botanical Gardens had never flowered. In other places, too, plants have been raised from seed, and though they have thriven well and become large trees, have shown no disposition to blossom. Whether the attempt has been made to cultivate this Mulberry in the Upper Provinces of India—where, no doubt, it would thrive, and where the prospect of its being fruitful would be possibly much greater—I am unable to say.

In reply to my inquiries upon this point, I learnt that "the English Mulberry grows in Kashmir, and has been grown successfully at Jullunder; only a few small seedlings exist in the Society's garden at Lahore."

Morus Indica and Morus multicaulis.

INDIAN MULBERRY.

Toot—Shahtoot.

These two trees, so very common in all parts of India, bear a description of Mulberry as unlike as possible, both in quality and form, to that of the European kind. The fruit is of a long cylindrical shape, resembling a pepper-corn, very sweet, but very deficient in flavour. There are two sorts, the black and the white, both much alike as to taste, and, in my opinion, fit for little but to be left to the birds. The fruit, such as it is, ripens in February in Bengal, and a month or so later in the Upper Provinces. No plant strikes more readily from cuttings than the Mulberry.

Ficus Carica.

FIG.

Unjeer.

In most parts of India Fig trees are to be met with, thriving vigorously and bearing fruit abundantly. There are about two or three varieties. In my garden at Ferozepore I had the following two kinds :—

1. One which bore fruit of the size of the small Turkey Fig, ripening of an ashy grey colour, exceedingly sweet and luscious. The tree was of very stout growth, having the lower part of its trunk sometimes as thick as a man's body. This appears to be the variety found in the Calcutta Botanical Gardens.

2. Another, brought me by a native nurseryman from Cawnpore, bore a much handsomer fruit, of the size of a pullet's egg, and when ripe of a deep purple colour. This, unless when very ripe indeed, was deficient in flavour and rather insipid.

These two varieties dropped their foliage and remained leafless during the three or four months of the cold weather. About March they broke out again into leaf, producing at the same time their fruit buds, which ripened fruit in July. About this time, too, a second crop was produced, which, however, never ripened.

"Figs," I learnt, "are grown in the Punjab, of many varieties, some of which, both black and white, are of very superior quality. Two imported plants of the black Ischia Fig are growing in the Society's gardens."

3. THE COMMON ENGLISH FIG.—In passing through the Deccan in the month of March, I found fine fruit of this for sale very abundant.

Some years ago Mr. H. Piddington sent a very large well-formed Fig, the produce of his garden in Calcutta, to the Agri-Horticultural Society with the following remarks :—

"I beg to send herewith a fine Fig, weighing two ounces (Troy), and six and-a-half inches in circumference—a size and weight, I think, equal to good hot-house Figs in England. If dried and flattened, this one would probably equal in size the largest Turkey Fig. In spite of the severe season, I have had about three dozen of very fine flavoured Figs from a very young tree, by the simple precaution of shading the fruit by a linen or paper bag. My tree is from Chandernagore; and I shall note, for those who desire to cultivate this delicious fruit, that the productive trees are those with somewhat narrow, dark-green, and deeply-lobed leaves. The variety with broad, light-green, but faintly-lobed leaves (which, by the way, seems to be the only one in the Botanical Gardens) never, that I have yet seen, ripens its fruit, though it produces plenty."*

The Fig is, notwithstading, still a great rarity in Calcutta. From some cause or other unknown, the locality seems very ill-suited to it. The two or three small stunted trees of the only one variety they have in the Calcutta Botanical Gardens remain as unproductive as they were at the time of Mr. Piddington's communication.

On one or two occasions young plants, stated to be of superior kinds, have been sent to the gardens of the Agri-Horticultural Society from Bombay, but they remained in pots, much in the condition in which they came, for a long time without making any growth. One of these, after having been put out in the garden for several years, had a stem no thicker than a stout walking-stick. I tasted the fruit it bore for the first time in 1861. The Figs were small, but sweet and agreeable. The tree died a month or so afterwards.

In Europe, the practice is to prune the Fig tree very sparingly, indeed merely in the summer season to pinch off with the finger and thumb the ends of the tender shoots. But in India the mâlees cut the trees in most severely in the cold weather, taking off all branches as thick as a man's thumb. During the time the trees have been at rest, I have opened the roots and applied to them a large quantity of blood from the shambles, but with no perceptible advantage. Copious irrigation, after the fruit is well formed, I found to accomplish all that could be wished.

"The Fig," observes Mr. McIntosh, "is not difficult to accommodate with a soil, provided it be dry at bottom; if there be a preference to

* 'Journal of the Agri-Horticultural Society,' vol. v, p. 24.

any other it is certainly one of a calcareous nature."* It may be noted here that in a sandy soil the Fig, including the English and Continental varieties, grows to perfection. In the "Ram Newas'" garden at Jeypore, in Rajputana, the choicest varieties were grown to perfection. The soil there is a red sandy loam of great depth. Copious watering is indispensable.

In those parts of the country where it thrives, no plant is more easy of propagation than the Fig. A branch cut off, however rudely, and stuck in the ground, with shade and watering, is almost sure to take root and grow.

I have not met with the Fig tree under cultivation on the hills.

ARTOCARPACEÆ.

Artocarpus integrifolius.

JACK-FRUIT.

Kuntul.

The fruit of this tree is perhaps about one of the largest in existence, and is an ill-shapen, somewhat oval-formed, unattractive-looking object. The interior is of a soft fibrous consistency, with the edible portions scattered here and there, of about the size and colour of a small Orange. By those who can manage to eat it, it is considered most delicious, possessing the rich spicy scent and flavour of the Melon, but to such a powerful degree as to be quite unbearable to persons of a weak stomach, or to those unaccustomed to it.

If the edible pulp of the fruit be taken out and boiled in some fresh milk, and then be strained off, the milk will, on becoming cold, form a thick jelly-like substance of the consistency of blanc-mange, of a fine orange colour, and of a Melon-like flavour. Treated in this way the fruit affords a very agreeable dish for the table.

There are said to be two varieties :—

1. The *Khujja,* or hard kind, distinguished by the large size of the edible pulp, and by the abundance and thickness of its juice. The exterior of the fruit is smooth to the hand, and green, and the nuts or seeds comparatively small. The leaves, too, are of a rounder form than those of the second variety.

2. The *Ghila,* or soft kind, is reckoned a much inferior fruit, with the inner pulp small in quantity, and its juice scanty, thin, and watery. The fruit is much smaller than the preceding, with a rough exterior, and with the seeds very much larger.

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* 'Book of the Garden,' p. 552.

The Jack-Fruit is not borne, like most other fruits are, from the ends of branches, but upon stout footstalks projecting from the main trunk and thickest branches of the tree. In no other way, indeed, could its ponderous weight be sustained. The situation of the fruit, moreover, is said to vary with the age of the tree, being first borne on the branches, then on the trunk, and in old trees on the roots. Those borne on the roots, which discover themselves by the cracking of the earth above them, are held in highest estimation.

The tree opens its blossoms and sets its fruit in November, and continues to do so even until March. The flowers when first opened give out a sweet, agreeable scent, very similar to that of the Magnolia pumila.

The tree grows to a considerable size, and is found in nearly all parts of India, but in greatest profusion in Lower Bengal. "It is very rare," I learn, "in the Punjab; though the few trees they have in Lahore thrive well and bear fruit." Major Drury states, "that if planted in a stony soil it grows short and thick; if in sandy ground tall and spreading, and if the roots happen to come in contact with water the tree will not bear fruit."

The following ingenious mode of training the tree is sometimes resorted to by the natives. Sow the seed imbedded in its own pulp. Fix over the young shoot, immediately upon its appearing above ground, a narrow hollow pipe, made by the union of the two halves of a bamboo that has been split in two, in order to remove the enclosures at the knots, and tied together again with string. This bamboo-pipe must be about three or four feet high. The Jack will soon ascend the pipe, and make its appearance at the summit. When it does so, remove the halves of the bamboo. Lay the young shoot, which will be found perfectly supple and pliant, upon the ground, and twist it into the form of a spiral coil, with the crown of the root for its centre. Cover this coil well over with earth, leaving the end of the shoot to project from the ground. The plant thus treated will grow in about five years' time into a tree, the spiral portion of it below ground enlarging correspondingly at the same time. Upon this spiral the fruit will uniformly be produced, and of the finest quality and largest size.

Not grown on the hills, where it could not exist owing to the cold climate.

Artocarpus incisa.

BREAD-FRUIT.

A handsome tree, with very large, polished, dark-green, slashed leaves, a native of the South Sea Islands, Moluccas, and Java. The fruit is of an oval form, and of the size of a large Melon, and in

general appearance much resembles the Jack-Fruit. It is, however, perfectly scentless. Its exterior is not muricated, but is marked with reticulations, with slightly prominent areolæ. It is without seeds, and when roasted is said to resemble the crumb of a new loaf. I have bought specimens in the bazar at Point de Galle in Ceylon. These, when sliced and fried, seemed to me, as well as to all who partook of them, to be hardly distinguishable from an excellent batter pudding. Fruit of a large size is said to be produced in Bombay, and in some parts of the Deccan, as well as in the Straits, but the fruit is quite unknown in the Bengal Presidency. A solitary specimen tree of large size may be seen in Mango-lane, Calcutta, and some young plants in the Royal Botanical Gardens, Seebpore, and the private nurseries in Narkuldanga.

Cannot be cultivated on the hills, except as a hot house plant.

BREAD-NUT.

A variety of the above, which produces fruit containing seed, with the exterior split into deep lobes, and covered over with the sharp-pointed tops of the calyces. Lofty trees of this variety are growing in the Calcutta Botanical Gardens, introduced, according to Dr. Voigt, in 1794. These had not flowered up to 1814, whence Dr. Roxburgh came to the conclusion that "the winters of Bengal were too cold for them." They, however, now both blossom and bear fruit regularly, yielding abundance of seed, from which young plants are raised.

Cannot be cultivated on the hills.

Artocarpus Lacoocha.

MONKEY-JACK.

Dêphul—Barhal.

A tree of moderate size, native of Bengal, with handsome oblong, entire, dark-green leaves, about eight inches long and four broad. In the rains it produces an ill-shapen fruit of the size of an Orange, with a smoothish rind of the colour of dirty wash-leather. It is of an austere taste, but it is sometimes eaten; and I have, moreover, met with those who said they liked it, a fact that I could otherwise have hardly credited. Propagated by seed in the rains.

Cannot be cultivated on the hills.

EUPHORBIACEÆ.

Emblica officinalis.

Amlá.

A small, rather handsome tree, with graceful foliage, native of India: admitted sometimes into gardens for the small round green fruit it produces in the cold season, which, though exceedingly acid, and quite uneatable raw, is made use of for either pickles or preserves. Propagated by seed sown in the rains.

Cannot be cultivated on the hills.

Cicca disticha.

OTAHEITE GOOSEBERRY.

Nuree—Nurphul.

A small tree, native of India, with light graceful foliage: yields a white fruit, in size and form resembling a large round ribbed button, with a hard stone in the centre. The fruit is commonly used by the natives for pickling. It has a sour, sorrel-like flavour, and is unfit to be eaten raw; but cooked with sugar it makes a most delicious compote, hardly to be distinguished from a preserve of green Gooseberries. Crops are produced twice in the year, about the end of April and again about the end of August. Plants may be propagated by sowing the stones in the rains.

Cannot be cultivated on the hills.

CUCURBITACEÆ.

Cucumis Melo.

MELON.

Khurbooza.

The culture of the superior kinds of Melon requires considerable attention, but there is hardly a fruit that better deserves it. The kind which ranks as finest of all, called the Surdah, is a native of Cabul, and has not, that I am aware, been cultivated with success in any part of India. The fruits are brought occasionally to the Punjab for

the wealthy natives, and a friend told me that when at Mooltan an offer of six rupees which he made for a single one was refused, so highly are they prized. I have several times raised plants in my garden at Ferozepore. They throve moderately well, but bore only one or two fruits, which always rotted on the under-side before beginning to ripen. From a portion of one which remained partially sound, I was enabled to discover how delicious this fruit must be when raised in perfection. The seeds of this kind are at once to be distinguished from those of any other, being fully four times larger.

The next kind, second perhaps only to the Surdah, and superior to any other with which I am acquainted, is, I believe, also of Cabul. Like the Surdah, too, it is of the green-flesh sort. It is of large oval form, with very smooth, pale-green exterior, traced here and there with a delicate network. This succeeded most satisfactorily at Ferozepore, and was the one which I cultivated exclusively. The seeds of this also may be known by the largeness of their size.

Next to the Cabul, the Safedah, or white, melon of Lucknow is, in my opinion, the finest to be had in India. It is small, about the size of a very large orange and flattened at both ends; white inside and out, with faint venation of the rind, and slightly blotched with green. It is deliciously sweet and luscious. It is grown in a sandy loam along the banks and in the dry bed of the Goomtee river, where it comes to perfection. Sow the seed in March.

"Seeds of two kinds of fragrant Melon seed from Buxar" were some time since presented to the Agri-Horticultural Society by Mr. W. H. Bartlett, who remarked: "With culture in a manured soil, the smaller of these Melons may be grown to a size somewhat larger than a large goose's egg, with a bright yellow rind. The flavour is slightly sub-acid, exceedingly pleasant with the addition of a little sugar. The time for sowing is June, though I think it might be sown earlier in Bengal, say April and May, and watered. The beds should be raised like those of a Tea-nursery, and watered if the weather is dry; it fruits from July to September. I also enclose seeds of another larger, well-scented, and very luscious variety, peculiar to the Deorah lands of Purneah and Bhaugulpore: the great thing is to sow them in raised beds."

Melons of superior kind, it appears, have been cultivated in the locality of Calcutta with complete success, when proper attention has been bestowed. Many years ago a silver medal with Rs. 200 was awarded to Mr. A. Millett, of Entally, by the Agri-Horticultural Society, for the successful cultivation of the Musk Melon. The method he pursued is given at p. 9 of vol. v. A. H. S. Trans.

A few years later Mr. Chew, after many experiments attended with failure, succeeded at last in finding the treatment by which the Melons

of Afghanistan might be raised in the locality of Calcutta with tolerable certainty of success. A short time ago I made inquiry of his brother, whether in the years subsequent to his communication to the Agri-Horticultural Society's Journal, he found his mode of culture equally successful. The reply was that he did, but that he only discontinued the cultivation on consideration of the trouble and expense.

The mode of culture will be the same for all parts of India, only that in the North-West Provinces it will not commence till a fortnight later perhaps than in Bengal.

1. The situation should be open and exposed as much as possible. Mr. Chew states that he has succeeded well with gumlahs on the roof of a house in Calcutta.

2. The soil of the ground, he says, should be one-eighth sand to seven-eighths clay. But this cannot be a point of any great importance.

3. Mr. Chew then directs that holes two feet deep, and two or two and a half feet in diameter, be dug at the distance of about four or six feet apart.

But the plan recommended by Major Napleton seems more convenient, and when the plants are to be watered by means of watercourses from the well, is the only one that can be adopted. "Dig a trench fourteen inches deep and two feet broad, and sow a double row of seeds, in each trench. When the plant is a foot high, train it along the dry ridge above the trench, taking care that it does not come in contact with the water, the roots only being watered."

4. The compost with which Mr. Chew directs the holes to be filled is composed of half well-decomposed horse or cow-manure and half earth.

5. About the middle of March Mr. Chew recommends as the most suitable time for sowing, and states that Afghanistan Melon-seed sown at that time grew with surprising vigour, and bore fruit simultaneously with plants that had been raised two months before.

6. Mr. Chew makes a great point of steeping the seeds in warm water, letting them remain twenty-four hours. He considers this absolutely essential. After the steeping he directs that they should be covered with a wet cloth, or kept in wet ashes two or three days until they sprout.

7. As soon as sprouted, Mr. Chew directs, sow them at about a foot apart and an inch or an inch and a half deep. Immediately deluge them with water, and so every evening until the plants are two inches above ground. After that an occasional drenching will be beneficial. A great deal depends, Mr. Chew observes, upon the plants being well watered at first, for those that spring up with vigour are not so subject to insects.

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The above directions given by Mr. Chew, which differ in no essential particulars from those given by Mr. Millett, are perhaps as good as can be followed. It should, however, also be kept in view, that the withholding of water when the plants are in blossom, and the giving it freely after they have set their fruit up to just when it is ripening, and the withholding of it again then, is as important to be observed in the cultivation of this as it is of every other fruit.

The Melon, if possible, should be always sown in the spot where it is to remain, as it can ill endure transplantation, and its roots should be disturbed as little as possible.

M. Ysabeau states: "It has been well ascertained that the fruit of the Melon is so much the better the nearer it is borne to the collar of the root. A system of pruning is therefore usually resorted to, for the twofold purpose—first, of causing the fruit to be produced as near as possible to the collar of the root; secondly, of arresting the growth of the stem beyond the Melons so soon as they begin to swell, and thus preventing the sap from being conveyed away from the fruit. The mode of proceeding is this:—Pinch off the central shoot of the young plant beyond the four first leaves so soon as they are formed. This will cause it to send out two lateral shoots. When these lateral shoots are about four inches long, pinch them in the same manner, and in a few days they also will put forth two side shoots each. This will give the plant four branches, which, pinched again when they have attained sufficient length, will give eight good shoots, which will be enough.

"Each shoot giving one or two fruits, about a dozen may be counted upon in all. These should be let grow just long enough till it can be decided which are the best to be preserved; and then a severe pruning should be made so as to leave the plant on an average two branches, each bearing a fine fruit."*

Another eminent French writer states that the secondary branches commonly produce male, or sterile flowers, and the tertiary almost invariably female, or fertile flowers.

He adds also: "The following method is a more simple one, and one likewise by which it is said better results are obtained:—Pinch off the shoot above the second leaf as soon as the seedling has formed it. Leave the two shoots which will then be formed till they have at least six leaves, and then stop them once for all above the fifth, sixth, or even seventh eye, and then let grow freely all the shoots which after that are produced. These bear fruit as soon as those that have been more frequently stopped, the plants are more vigorous, and the Melons better nourished.

* 'Le Jardinier de Tout le Monde,' p. 215.

"As in the former method, when good fruits are set, pinch the shoot to one eye above each fruit which the plant is allowed to bear, and nip off all other fruits that are there, or may afterwards be formed. The young fruits thus plucked off may be preserved like Gherkins, or cooked, when they will be found exceedingly delicate, treated in the same manner as Cucumbers or Squashes."*

The Melon in the earlier stage of its growth is, like the Cucumber and Squash, very subject to the depredations of a small red beetle, by which it is infested. The usual means adopted to keep this away is sprinkling of wood-ashes over the leaves. This, however, is only to remove one evil by introducing another almost as bad; for the plants can hardly be expected to thrive with the pores of their leaves thus stopped up. A piece of common gauze stretched upon a frame, as suggested elsewhere, would no doubt be a cheap and effectual remedy.

The following remarks by other writers are interesting, and perhaps may be found useful. Mr. Knight stated that "sufficient breadth of foliage is the main point for bringing Melons to perfection."

Morier says that "in Persia pigeon's dung has from time immemorial been sought after for manuring Melons."

Another writer says that "soil holding any salt of iron is sterile in its application to Melons. This may be tested by burning a portion and applying a magnet."

A writer in the 'Gardeners' Chronicle' states that the way of cultivating the Cabul Melon in its native locality is, "when the fruit is of the size of a walnut, cover with a handful of clay, and scrape holes in the ground for it to sit in."

Another writer in the same paper says: "I defy any one to produce Melon fit to be seen in a loose sandy soil. The stronger, the stiffer the loam the better. I use grafting clay, and have Beechwood Melons twelve pounds in weight and unsurpassable in quality." The Bikanir Melon is *always* found growing buried in sand, especially in the desert, and is a most luscious and deliciously sweet fruit. It forms the food and drink of the people in the neighbourhood of the Bikanir desert.

The usual mode of cleaning the seeds from the pulpy mass in which they are contained is to mix them up with wood-ashes, whereby, after they have been well rubbed and then spread out to dry, they will be rendered quite clean.

Where it is intended to save seeds, caution should be taken that no inferior Melons be cultivated anywhere near. For being a monœcious plant it is as likely to become impregnated with the pollen of the

* 'Le Bon Jardinier,' pour 1866, p. 518.

inferior plant as with that of its own kind. And even with every such precaution a wandering bee from some adjacent garden may fly over and do a world of mischief, only to be detected by the produce afforded in the following season.

On the hills the Melon can be cultivated easily in ordinary glazed frames with bottom heat, and kept in deep pans. Sow the seed in April.

Cucumis momordica.

Phoontee.

A very common fruit, cultivated by the natives all over India. It is of the size and form of a large Cocoanut, perfectly smooth, and of a pale yellow colour when ripe, and has the flavour of a very indifferent Melon.

It is cultivated by the natives in precisely the same way as the Melon.

Cucurbita citrullus.

WATER-MELON.

Turbooza.

The Water-Melon is met with in common cultivation in all parts of India. The fruit is of oval form, of the size of the largest Pumpkin, perfectly smooth, and when ripe of a dark green colour. It is very refreshing and agreeable in the hot weather, when it is in season.

The cultivation of it demands no particular care. The seeds are sown in February in common garden soil, in a spot where they have plenty of room to trail. The plants require abundance of water.

The natives often cultivate Water-Melons in great quantities on the shoals of rivers, from which the water has subsided. A plan it appears they have is in the middle of April to dig a hole under each Melon and bury it with sand, making the hole large enough for the Melon to swell.

In the desert of Bikanir a variety of Melon grows in the sand, or rather, *under* it, and is a very delicious fruit.

PAPAYACEÆ.

Carica papaya.

PAPAW.

Pepiya.

The Papaw-tree is a native of tropical South America and the West Indies, but has become thoroughly naturalised in this country. The fruit, which is in the form of a Pear, and much larger than a Cocoanut, ripens of a pale greenish yellow. The finest are said to be produced from the Singapore and Moulmein stock. The fruit presents a tempting appearance when cut open, resembling that of a fine orange-flesh Melon. Though not of high flavour, it is very cool, refreshing, and agreeable, when eaten with sugar raw. The small, olive-coloured, shot-like seeds with which the interior of the fruit is filled, are liked by some for their watercress-like flavour, and moreover are considered very wholesome.

The tree comes into flower first in February, yielding a crop of fruit in March and April, and again during the rains, emitting at times a fine fragrance all around from the numerous small greenish-yellow blossoms. It generally produces an immense crop of fruit, and continues blossoming after the fruits on the lower part of the branch have attained to a great size. The fruit is in season during the whole of the cold months.

The proper mode of cultivation to be adopted is obviously to remove all but a few of the fruits, when of a small size, as well as to nip off all flowers afterwards from the upper branches of the tree, and during the period the fruit is swelling to administer, when the soil is dry and seems to require it, copious supplies of water; but this trouble, I believe, is never taken, and few perhaps will think the fruit of sufficient value to deserve it. At Gowhatti, however, I have partaken of fruit—subjected, I conceive, to such treatment—that from its excellence was hardly to be recognised, being of the size of a Water-Melon, and delicious in flavour.

Plants are raised from seed sown in February and March, and in September, and are of very rapid growth, rising to eight or ten feet high, and coming into bearing in about ten months. In the earlier period of their growth the plants have a pretty palm-like appearance, but on growing old they become rather unsightly. The flowers with male and those with female organs are borne on distinct plants, therefore among several trees some will of course be unproductive.

Don says :—

"The most extraordinary property of the Papaw-tree is that which is related first by Browne in his 'Natural History of Jamaica;' namely,

that water impregnated with the Milky juice of this tree is thought to make all sorts of meat washed in it tender; but eight or ten minutes' steeping, it is said, will make it so soft, that it will drop in pieces from the spit before it is well roasted, or turn soon to rags in boiling. This circumstance has been repeatedly confirmed. Old hogs and old poultry, which are fed upon the leaves and fruit, however tough the meat they afford might otherwise be, are thus rendered perfectly tender and good if eaten as soon as killed; but the flesh passes very soon into a state of putridity. In the third volume of the Wernerian Society's Memoirs, there is a highly interesting paper on the properties of the juice of the Papaw-tree by Dr. Holder, who has witnessed its effects in the island of Barbadoes, and speaks of them as known to all the inhabitants. The juice causes a separation of the muscular fibres. Nay, the very vapour of the tree serves this purpose; hence many people suspend the joints of meat, fowls, &c., in the upper part of the tree, in order to prepare them for the table." *

Dr. Davy, however, who made some careful experiments to ascertain the truth of what is above stated, came to the conclusion that the Papaw-tree possesses none of the singular properties which have been assigned to it, more than any other tree.† The juice of the fruit is, however, undoubtedly a powerful solvent, and digestive; for it is now largely prescribed for dyspeptic patients by physicians..

Cannot be cultivated on the hills.

FLACOURTIACEÆ.

Flacourtia, cataphracta.

PUNEEÂLA-PLUM.

A small tree, native of India, grows to the height of about twenty or thirty feet, with small leaves and branches covered with numerous thorns.

The fruit ripens during the months of September and October, and is of the form and size of a Cherry or Tipâree, slightly compressed into a five or six-sided shape. It is of a deep dull purplish chocolate colour. In flavour it is suggestive of something better than a Sloe, but worse than an indifferent Plum. The usual plan before eating it, whereby it is rendered softer and more agreeable, is to turn it round between the thumb and forefinger, gently pinching it at the

* Don's 'Gardener's Dictionary,' vol. iii. p. 44.
† See 'Journal of Agri-Hort. Society,' vol. ix, p. 73.

same time and then roll it between the palms of the hands. By this means it becomes much sweeter in flavour, losing that austerity it before had. It affords an exceedingly nice compote when cooked with sugar. The tree seems to be unknown in the Punjab.

Plants are propagated from seed sown in June and July. It requires no particular cultivation. Not cultivated on the hills.

Flacourtia inermis.

TOMI-TOMI.

This tree, which is easily distinguished from the foregoing by its being entirely thornless, and by its large handsome leaves, bears a somewhat similar but very inferior fruit a month or two late in the season. Cultivated same as the foregoing.

PASSIFLORACEÆ.

Passiflora.

GRANADILLA.

There are about four or five varieties of Passiflora described as bearing edible fruits, called Granadillas.

1. **P. quadrangularis**—COMMON GRANADILLA, bears a fruit of an oblong form, about as large sometimes as a child's head. The flavour is sweet and slightly acid, very grateful to the taste, and refreshing in a hot climate, where it is usually eaten with wine and sugar.
2. **P. maliformis**—APPLE-FRUITED GRANADILLA *or* SWEET CALABASH.
3. **P. laurifolia**—WATER-LEMON, is most extensively cultivated in the tropics, being agreeable to most palates.
4. **P. edulis**—PURPLE-FRUITED GRANADILLA, produces fruit of the size and shape of a hen's egg, green at first, but when ripe of a beautiful plum colour.
5. **P. incarnata**—FLESH-COLOURED GRANADILLA.

In addition to the above thus described by Mackintosh,* might perhaps be numbered Tacsonia mollissima, which I have seen at Ootacamund, bearing in great abundance a pale-green fruit of the size of goose's egg, and of rather agreeable flavour, but the plant does not seem able to bear the climate of the plains.

P. quadrangularis is the only Granadilla that has been known to bear fruit here, and that not commonly about Calcutta. I found

* 'Greenhouse,' p. 380.

the plant in a garden at Gowhatti, grown upon a Bukâyun tree, and bearing in great profusion in December; but the fruit fell far short of the description given of it above, both as to size and flavour, being of an oblong form, of the size of a large Lemon, and very insipid to the taste. It was sometimes put in tarts, but required flavouring. The natives used it also for curries. A writer in 'Rees' Cyclopædia' says: "To flower and fruit in perfection, it requires to be cut down every year to the main trunk, which soon acquires the size of a small Cherry-tree. We have seen it laden with huge flowers, magnificently variegated with violet purple and crimson and green, with leaves a foot long." P. maliformis does not appear to have been yet introduced; and P. incarnata, formerly in the Calcutta Botanic Gardens, does not exist there now.

If the plants be worth cultivating for their fruit, which is very questionable, possibly success might be arrived at by attending to the mode of cultivation prescribed for the purpose.

The following is Mr. Appleby's mode of setting P. quadrangularis:—

"The whole of the calyx, corolla, and crown must be cut off with a sharp pair of pointed scissors, and this must be done without injuring the flower-stem. When all these are cut away, there only remain the essential parts of the flower—the stamens, five in number, and the three stigmas. Then cut off one or more of the stamens bearing the anthers; and do this without shaking the dust or pollen out of the anther, covering them with the fertilising powder. Take an opportunity of performing this operation early in the morning, at the very time when the anthers are observed to be bursting." *

"When the crop is all off, the shoots must be well cut in. As little old wood as possible besides the main stem, and a few pieces (about two or three feet of each) of the old branches, should be retained; for all that is to be trained to bear in each year ought to be the growth of two years' standing." †

Propagated by layers and seed.

Cultivated on the hills in a glass-house.

STERCULIACEÆ.

Adansonia digitata.

BAOBAB—MONKEY-BREAD.

Bilâetee Imlee.

In Senegal, its native locality, this grows to become one of the largest trees in existence; but the trunk, even in small trees, has an

* 'Cottage Gardener's Dictionary,' p. 439. † Sabine, in 'Hort. Trans.'

inflated, gouty appearance, suggestive of its bulkiness being rather the result of disease than of natural healthy growth.

The fruit is of about the size and form of an ostrich egg, with a rind similar in texture and colour to that of a tamarind pod. An agreeable sherbet is said to be made from it, which indeed seems the principal purpose for which it is used.

There are two or three large trees in the Calcutta Botanical Gardens, but the fruit they bear is small and indifferent, no larger than a hen's egg. The village of Nâlcha, near the celebrated old city of Mândoo, in the Deccan, is famous for the number of trees that grow there. They are rarely met with in other localities on this side of India.

Durio zibethinus.

DURIAN—CIVET-CAT FRUIT.

A large forest-tree, growing to the height of eighty feet, is a native of Malay, and thrives well in Burmah and the Straits.

The fruit is about the size of a man's head, within which is the seed, with its edible enveloping pulp, of about the size of a hen's egg. The pulp is pure white, resembling blanc-mange, and as delicious in taste as the finest cream. The bulk of the fruit, however, in which this creamy pulp is enclosed is intolerably offensive, having the smell of putrid animal substance, or rotten Onions. The seeds, when roasted, are said to have the flavour of Chestnuts.

Plants have repeatedly been introduced into the gardens about Calcutta, but they have never risen to more than about three feet in height, when they have uniformly died off, the climate of that latitude being quite unsuited to them.

MALVACEÆ.

Hibiscus sabdariffa.

ROSELLE—INDIAN SORREL.

Putwa—Mesta.

An annual, native of the West Indies, but now cultivated in most gardens in India.

The part of the plant made use of is not the fruit itself, but the large thick succulent sepals which envelope it. Of these most delicious

puddings and tarts are made, as well as a remarkably fine jelly, hardly to be distinguished from that of the Red Currant, for which in every respect it forms an excellent substitute.

There are two kinds, the red and white, much the same except that the white seems a trifling degree less acid.

The seeds are sown about the end of May, and the plants are put out in the ground at the distance of four feet from each other. It grows to the height of three or four feet, and bears a large handsome yellow flower, with a dark crimson eye. The gathering for use may be made in November or December in Bengal, but it must be somewhat earlier in the Upper Provinces, before the plants are destroyed by the cold.

It seems to thrive best in the damp climate of Lower India. In Ferozepore I found the full-grown plants very apt to perish before coming into bearing.

Cannot be cultivated on the hills.

TILIACEÆ.

Grewia Asiatica.

Phâlsa.

A coarse-looking, unattractive shrub, somewhat resembling the Hazel in foliage; native of India, and common in all parts of the country.

The fruit is a berry about the size of a Pea, with a stone in the centre, sour and uneatable, but a sherbet is made from it considered agreeable by some. The fruit is produced during the hot months. It needs no particular cultivation, and is easily propagated : cuttings and seeds put down in the rains.

Grewia sapida.

This also, like the last, produces during the hot season, its crop of berries, sometimes used for making sherbet.

Neither of the above can be cultivated on the hills.

SAPINDACEÆ.

Blighia sapida.

AKEE.

A large tree, native of Western Africa. The fruit is of the size and form of a small Lemon, somewhat ribbed, and when ripe of a brilliant

vermilion colour. Though much eaten, and held in high esteem in the West Indies, it is never, that I can learn, eaten in this country. Sir J. Paxton declares it to be "not much inferior to a Nectarine in flavour." Don says that in Guinea the tree "is greatly esteemed for the excellence of its fruit, which is of a grateful sub-acid flavour." It appears, however, to be treated rather as a vegetable than as a fruit, according to the description given of it by Dr. Macfadyen, who says :—

"The fruit is brought in great abundance to the Kingstown market. The arillus, which supports the seed, is the part which is eaten. It is prepared by parboiling in water with salt, and afterwards stewing or frying with butter, or by simply boiling in soup. It is very wholesome, and from its soft, rich flavour well deserves the appellation of the Vegetable Marrow." *

Mr. Leonard Wray also, in presenting seeds to the Agri-Horticultural Society, accompanies them with the remark :—

"Akee, an ornamental small tree, and a delicious vegetable, sometimes eaten raw, but generally fried together with butter and black pepper."

In the Calcutta Botanical Gardens there are two trees which have grown to a great size, and in the garden of the Bankshall at Calcutta there is also a tree. It appears to have been somewhat scarce in India some time ago, for Dr. Gibson says of it: "The Gardens at Parell and at Dapooree can boast of the Blighia sapida of New Zealand, now producing fruit (at least at Dapooree) annually." † At Calcutta it comes into blossom in June and ripens its fruit in October.

In the public gardens at Madras were some small trees about ten feet high, which, when I saw them in the month of September some years ago, looked remarkably ornamental, covered with their scarlet fruit, contrasting beautifully with the fine rich foliage amongst which it hung. As far as I could learn by inquiry, the fruit was never eaten by any one there. Propagated by seed and gootee.

Cannot be grown on the hills.

Nephelium lichi.

LICHEE.

A large-growing shrub or small tree, of dense handsome foliage, native of China. It blossoms about the middle of February with

* 'Flora of Jamaica.' vol. i, p. 160.
† Dr. Spry, 'Plants for India,' p. 62.

sprays of small pale-green flowers, and ripens its large bunches of fruit about the end of April or beginning of May. The fruit is of the size and form of a large Plum, with a rough, thin, scale-like rind which, while the fruit is hanging ripe upon the tree, is of a beautiful red tinge, but gradually becomes of a dull brown colour a short time after being gathered. The pulp of the fruit, which is as delicious perhaps as that of any fruit in existence, resembles the white of a plover's egg, and contains in its centre a stone. In the best fruit the stone is very small comparatively; and in this respect the fruit produced on different trees varies much.

It is stated that there is only one province in China where the Lichee is grown to perfection. In the gardens, however, about Calcutta, and at Chinsurah in particular, fruit of the finest quality imaginable may be met with. That produced on the trees in the Calcutta Botanical Gardens is of a very inferior description, the pulp being scanty in quality and acid in flavour: fruit of a similar kind likewise is usually sold in the Calcutta bazars, probably the produce of trees formerly distributed from the Botanic Gardens.

I have tasted the variously-named kinds in the Gardens of the Agri-Horticultural Society, from which plants are propagated for distribution; and in my opinion the sort called M'Lean's is decidedly the best, though not finer than is frequently met with in private gardens.

A variety is cultivated in Bombay, bearing fruit of a conical form, of a purplish colour when ripe, distinct in flavour, and of very sweet taste.

Don says that when eaten to excess, Lichees are apt to occasion an eruption over the whole body. They are eaten in great quantities in India, but with no deleterious effect that I ever heard of.

The Chinese suffer the fruit to dry till it becomes black and shrivelled, in which condition it is commonly met with for sale in the London grocers' shops.

Birds are exceedingly fond of the fruit. The trees must be protected from their ravages by having nets thrown over them some time about the beginning of April.

The Lichee tree will grow well in all parts of India; but in the North-West it is liable to be killed by the cold in severe weather. It loves a damp climate and abundance of water, and is said not to yield good fruit at any considerable distance high up from Calcutta. It is, however, cultivated with success in Saharunpore.

Colonel Sleeman states that at Lucknow the Lichee cannot be brought to thrive at all. Small plants throve tolerably well at Ferozepore. I had several in the lowermost part of my garden there, which were swamped for more than a week during the heavy rains in August. Most plants under such circumstances would have perished, but these seemed benefited thereby.

Lichees may be propagated by seed, which it is said will not keep, but must be sown at once; but the surest way to obtain plants that will produce good fruit is to propagate by gootee about the end of May. The gootee made at that time will be ready for removing and potting off by the commencement of the cold weather; and may be planted out, where it is finally to remain, in the following rain season. Also by grafting, or inarching.

Cannot be cultivated on the hills.

Nephelium longanum.

LONGAN.

Ashphul.

A tree, native of India, and cultivated in China and Cochin-China.

The fruit, which, in the vicinity of Calcutta, is produced about the end of June, is about the size and form of a marble, of a russet colour, and borne in bunches like Grapes. The fleshy part of the fruit, which resembles that of the Lichee, is sweetish, and, though not disagreeable, is vapid and vastly inferior in flavour to the Lichee. The mode of cultivation is the same as for the Lichee.

Pierardia sapida.

Lutqua.

A small tree, native of Burmah and Eastern Bengal.

The fruit, which, like that of the Lichee, is borne in large clusters, is said to be equal in point of merit to either the Lichee or the Loquat, which latter it resembles. Roxburgh describes it as an agreeable fruit, round, of the size of a Gooseberry, smooth and yellow, and cultivated by the Chinese under the name of Lutqua.

The tree abounds in Sylhet and Burmah, but appears to be hardly known in Calcutta. Formerly there were fruit-bearing trees in the Calcutta Botanical Gardens six or ten feet high, introduced from Tipperah, of the produce of which the mâlees there still speak in high praise. But these were cut down many years ago, and now none are to be found there. It is a very common tree in the district about Gowhatti in Assam. Its fruit, which it produces in large dense bunches, in great abundance at the end of June and beginning of July, is of a roundish form, and in outward appearance bears a strong resemblance

to a yellow Plum. It has a dense leathery rind, and contains, or rather is all but filled up with, three or four large seeds, each surrounded with a tough kind of pulp, which can hardly be said to be more than just moistened by the small quantity of sharp-flavoured juice it contains. In my opinion a very poor and valueless fruit; but under good cultivation, it might possibly prove far different. Propagated by seed during the rains.

Cannot be cultivated on the hills.

MALPIGHIACEÆ.

Malpighia glabra.

BARBADOES CHERRY.

Sir R. Schomburgk says:—

"The fruit is much used in Barbadoes in preserves and tarts, and there is something in the taste reminds one rather of the Raspberry than of the Cherry. . . . . It bears eatable fruit, in appearance and size resembling Mayduke Cherries, but, though juicy and sweet, in every respect inferior to M. urens: the fruit of this may be likened to common wild Cherries of our plantations." *

Both the above species are very common in the gardens about Calcutta, thriving well, and forming very handsome flowering shrubs. M. glabra bears in the cold season a few scattered bright-red fruits, somewhat like Mayduke Cherries it is true, but very small ones. Such as I have eaten I have found to be mere worthless berries, pithy, tasteless, and juiceless.

Propagated by cuttings put down in October.

Cannot be cultivated on the hills except as an ornamental shrub in the glass-house.

CLUSIACEÆ.

Mammea Americana.

MAMMEE-APPLE.

A large timber-tree, native of the West Indies.

The fruit Dr. Lindley mentions as "the wild Apricot of South America, said to rival the Mangosteen." It is described as "Yellow,

* Paxton's 'Flower Garden,' ii. 18.

not unlike, either in shape or size, one of the largest russet Apples. The outer rind, which easily peals off, is thick and leathery; beneath this is a second very delicate coat, which adheres closely to the pulp, and should be carefully removed before eating the fruit, as it leaves a bitter taste in the mouth. The seeds, of which there are two or three in the centre, are resinous and very bitter; but the pulp under the skin, which, when ripe, is of a deep yellow, resembling that of the finest Apricot, and of considerable consistency, is very fragrant, and has a delicious but very peculiar flavour. It is eaten either raw and alone, or cut into slices with wine and sugar, or preserved in syrup."

Dr. Macfadyen describes it as "of a sweetish aromatic taste, bearing a resemblance to that of a Carrot."

It was introduced into the Calcutta Botanical Gardens very many years ago, where it now. Dr. King, the Superintendent, tells me, "grows well, and yields a plentiful crop of fruit annually."

Garcinia Mangostana.

MANGOSTEEN.

The Mangosteen is a native of the Malay Islands.

The fruit is held in the very highest estimation. Don declares it to be "in flavour the most delicious fruit in the world, partaking of the Strawberry and the Grape." It is said that to taste the fruit in perfection it must be eaten as it is gathered from the tree. The specimens brought occasionally to Calcutta from the Straits are of the size of a middling-sized Apple, perfectly smooth, with a dense rind, which, when removed, the centre is found to consist of a soft, white, pellucid, most agreeable pulp. But these convey hardly a notion of the fine flavour of the fruit when gathered fresh. The cultivation of the Mangosteen, in the open air at least, as high north as any part of Bengal seems now pretty well decided to be impracticable. Plants have been repeatedly introduced into the gardens about Calcutta, but have never been known to yield fruit. Mr. R. Solano, notwithstanding, assured me that he had in his garden at Shahabad three trees, about six feet high, and that one of these had borne fruit two years in succession.

Propagated by gootee.

Cannot be cultivated on the hills.

Garcinia Cowa.

COWA—COWA-MANGOSTEEN.

A very handsome tree, with fine luxuriant foliage of large laurel-formed leaves; native of Southern India.

The fruit ripens at the beginning of June, and is of the size and form of a small Orange, ribbed, and of a russet-apricot colour; and were it not a trifling degree too acid, would be accounted most delicious. It makes, however, a remarkably fine preserve.

Plants are raised easily by sowing the fibre-covered stones with which the centre of the fruit abounds.

Cannot be cultivated on the hills.

Xanthochymus pictorius.

Toomul.

A fine handsome tree from thirty to forty feet high; native of this country; bears in April rather large white flowers.

The fruit is remarkably handsome and luring, of the size and form of an Orange, but with surface perfectly smooth like that of a Plum, and of a bright yellow colour. If it were possible by cultivation to subdue its intolerable acidity, it would rank in merit, I consider, with any fruit grown. Don says, "it is not inferior to many Apples;" but I see no point of similarity in it to suggest such a comparison. The greatest degree of acidity resides in the thick fleshy rind. The pulpy part in which the seeds are enclosed is less acid, but very acid still; indeed so much so as to put any one's teeth out of order for a day or two after having partaken of it. Underlying this intense acidity, however, is a fine flavour, resembling, as I think, that of the Apricot. The fruit begins to ripen about the middle of September, when, if not protected, it is greedily devoured by flying foxes. Propagated by seed sown during the rains.

I have endeavoured to make a preserve of it, thinking that the acidity might be so far overcome by cooking as to render it agreeable to the palate. But I found that the resinous property with which it abounded made it then quite unfit for eating.

Cannot be cultivated on the hills.

Calysaccion longifolium.

Woondee—Suringee—Soorgee.

A small tree remarkable for its fine handsome dense Laurel-like foliage, said to be frequently met with in the Deccan of India, though hardly known in Bengal, except by some two or three thriving specimens in the vicinity of Calcutta.

The fruit is about the size of an acorn, to which also it is very similar in appearance. It encloses a large stone, between which and the rind is a soft pulpy juice of rosewater-like flavour, considered very agreeable by some. It is not, however, accounted an edible fruit. It ripens about the middle or end of May.

Easily propagated by sowing the stones in June and July.

Cannot be cultivated on the hills.

ANONACEÆ.

Anona squamosa.

CUSTARD-APPLE.

Atâ—Shureefa—Seeta-phul.

A small tree; "no doubt," Dr. Voigt observes, "a native of tropical America, notwithstanding St. Hilaire's reasonings, which would make it of Asiatic origin." Dr. Anderson in his recent catalogue sets it down as a native of both tropical Asia and America. It is most abundant in Bengal, and produces its rather large, greenish-yellow flowers about the middle of May.

The fruit is of the size of the largest Apple; and when thoroughly ripe difficult to raise without the tortoise-shell-like compartments of the rind bursting open, and the fruit dropping to pieces by its own weight. The custard-like substance of the interior has a most delicious and delicate flavour. Dr. Macfadyen, however, speaking of it as produced in the West Indies, says that he "has never met with a European who was partial to it."* This would seem to imply that the fruit produced in India, where it is so universally approved of, must be vastly superior to that grown in what has been assigned as its native locality. It is in season in this country during the greater part of the rains and cold months. The tree, when bearing, requires to be covered by a net, or the produce, before fit to be gathered, will almost be sure to be devoured by birds or squirrels. To effect this more conveniently, as well as to improve the bearing properties of the tree, a judicious system of pruning may with advantage be adopted. Or the fruit may be preserved by wrapping each one up severally, when about the size of a hen's egg, in a piece of thin muslin.

General Jenkins writes: "The fruit as brought to market are generally forced in straw, being gathered long before they are ripe,

* 'Flora of Jamaica,' p. 9.

otherwise they would require netting. This tree grows in the highest perfection, in the most rocky, hot, and barren parts of the country, and spontaneously. The largest I remember to have seen were at Punnah, the most barren of sterile places. The tree grows out of crevices of rocks and old walls, and apparently wild."* The finest fruits are grown in Cawnpore and that neighbourhood.

Plants are propagated from seed, and are of very rapid growth, coming into bearing in two or three years' time. A supply of old lime or mortar, and cow manure to their roots during the cold months is of great benefit to them.

Cannot be cultivated on the hills.

Anona reticulata.

BULLOCK'S HEART—SWEET-SOP.

Nona—Râm-phul.

A small tree, native of tropical Asia and America, and very common in India. But it cannot be cultivated with success in the Punjab.

The fruit differs from the Custard-apple in having a perfectly smooth rind, and derives its name from the resemblance it bears to a bullock's heart. The interior is full of a thick, luscious, custard-like substance. It is not of so fine and delicate a flavour as the Custard-apple, but being in season during the hot months, when Custard-apples are not to be had, it is accepted as a very agreeable fruit. While ripening it requires to be protected from the depredations of birds and squirrels and bats, by a netting or by some other means.

Plants are propagated from the pips sown during the rains, the cultivation being the same as for the Custard-apple.

Cannot be grown on the hills.

Anona muricata.

SOUR-SOP.

Biláetee Nona.

A small shrubby tree, native of the West Indies, with dark-green, shining, laurel-like leaves of a pungent odour, something like that of the Black Currant, and a very ornamental object when bearing, in

* General Jenkins' MS. notes.

July, its fine large heart-shaped fruit. The fruit Mr. Gosse describes as "lusciously sweet, and of a delightful acidity; often larger than a child's head; covered with flexible prickles."* Grown in this country it by no means realises the above description, but is considered by most persons of so harsh and unpleasant a flavour as to be quite uneatable.

This tree, by no means common in India, I found rather plentiful at Gowhatti in Assam, where it produces fruit as large as a moderate-sized Jack.

The fruit begins to ripen about the latter end of June, and is in season in July and August, retaining when ripe its dark-green colour. It is of the form of a bullock's heart rather prolonged, and not unfrequently of a kidney-form, from the apex taking a curve upwards. The substance of the fruit amongst which the seeds are scattered is of a soft woolly pulp, intermixed with a juicy mucilage of a strong, rather vinous flavour, somewhat like that of the Pine-apple; but it is wanting in sweetness, and has a certain degree of rankness that causes it to be disliked by most persons who have not acquired a taste for it. To most palates, however, it may be made agreeable by putting the pulp into a tumbler, sweetening it with pounded loaf-sugar, and pouring over it a glass of sherry. There is a considerable difference in the produce of different trees, some proving vastly superior to others.

Plants are raised easily from the pips sown in July and August, the cultivation being the same as for Custard-apple.

Cannot be cultivated on the hills.

Anona cherimolia.

CHERIMOYER.

The fruit of the Cherimoyer is described as "of the size and form of the Sour-sop, and of a light green colour, or as holding a middle place between the Sweet-sop and Custard-apple, being subsquamous like the former, and reticulated like the latter."

It is a native of Peru. Mr. Gosse states that the fruit is grown to perfection in Jamaica, but only in certain mountainous localities.

Mr. Markham says:—

"They have most of the other kinds of Anonas in India, but the Cherimoyer fruit, the most exquisite of all, has yet to be raised. He who has not tasted the Cherimoyer has yet to learn what fruit is."

"The Pine-apple, the Mangosteen, and the Cherimoyer," says Dr. Seemann, "are considered the finest fruits in the world. I

* 'Naturalist's Sojourn in Jamaica,' p. 46.

have tasted them in those localities in which they are supposed to attain their highest perfection—the Pine-apple in Guayaquil, the Mangosteen in the Indian Archipelago, and the Cherimoyer on the slopes of the Andes—and if I were called upon to act the part of a Paris, I would without hesitation assign the apple to the Cherimoyer. Its taste, indeed, surpasses that of every other fruit, and Haenke was quite right when he called it the masterpiece of nature."*

Dr. Lindley observes :—

"Fenellé says, one European Pear or Plum is worth all the Cherimoyers of Peru."†

Plants are to be met with in the gardens of the Agri-Horticultural Society as well as in the Calcutta Botanical Gardens, where they were introduced a great many years ago, but their cultivation has been attended with no success. The tree does not even set flowers in Bengal. Dr. Jameson states also in his Report that the Cherimoyer had been introduced into the Saharunpore Gardens, but had been found not to succeed there. Whence perhaps it may be fairly concluded there is little prospect of this fruit ever being produced in India, unless possibly upon some spot on the slopes of the Himalaya, or on the Nilgherries, where plants have recently been raised from the seeds imported by Mr. Markham. A hard, stiff soil, with lime suits it. It has recently, I believe, been cultivated with success at Bangalore.

Propagated from seed sown during the rains.

Cannot be cultivated above 2,000 feet elevation.

DILLENIACEÆ.

Dillenia speciosa.

Chulta.

A tree of considerable size, native of India; bears a dense head of exceedingly handsome foliage, with large noble leaves, and produces in July great, beautiful, pure white, fragrant flowers, succeeded by fruit, having as they hang upon the tree a resemblance to enormous green Apples. These are gathered for use about the middle of September. The part made use of for the table is not the fruit itself, but the large thickened sepals of the calyx, by which it is firmly enclosed. Tasted raw these have the exact flavour of a very sour unripe Apple,

* 'Travels in Peru and India,' p. 337.

† 'Transactions of the London Hort. Society,' vol. v, p. 102.

and when cooked with sugar have also exactly the flavour of the same fruit cooked in the same way. The great objection to them is the large quantity of fibre they contain. They are very commonly mixed as an ingredient in curries, especially in those made with prawns, to which they impart a most agreeable flavour.

Plants are propagated by seed sown in June and July.

Cannot be cultivated on the hills.

VITACEÆ.

Vitis vinifera.

GRAPE.

Ungoor.

The varieties of Grape found in different parts of India are no doubt very numerous, and some, probably, as large in size and as fine in flavour as are to be met with in any part of the world. In my grapery at Ferozepore I had some four or five sorts (the names unknown to me), all of exquisite flavour. Dr. Jameson, speaking of the vines in the Shaharunpore Botanical Gardens, says: "The different varieties of Cashmere vines are very fine, and well worthy of extensive cultivation, particularly the varieties *Kishmish*, *Monucka*, *Housanee*, *Muska*."

The Aurungabad "Hubshee" Grape is one of the most celebrated varieties in India. It is a black fruit of large size, sweet, and of livery consistency, much like the Portugal Grape sold in grocers' shops in London. It is cultivated to great extent in the vineries of Doulutabad, and is much in request in that part of the country, being conveyed for sale to a considerable distance around, and realising four times the price of the ordinary white Grapes grown there.

None of these grapes appear to have reached the district of Calcutta, or, if so, have probably perished, from the climate being unsuited to them. I myself brought to Chinsurah from Ootacamund in the year 1859 four choice varieties of European vines; but they made no growth whatever, and at the end of two years were poor stunted plants of much about the same size as when I first obtained them.

The following varieties were grown by Mr. L. Berkeley in his garden at Lahore, imported by himself from England: 1, Black Frontignan; 2, Black Hamburg; 3, Golden; 4, Muscat; 5, Constantia; and 6, a dwarf French kind (name lost), bearing a very delicate and sweet-flavoured fruit, which lasts for months without decay. He told me, moreover,

they have in the Punjab the Bedâna, or stoneless Grape, said to be indigenous there.

Dr. Henderson introduced at Lahore as many as sixteen kinds of Grape-vines from Europe, which have succeeded remarkably well.

It is asserted by Mr. J. L. Denman that "no attempt hitherto made to transport a particular species of vine to another country has ever been attended with such a measure of success as to reproduce in the new site precisely the same distinctive properties that signalized it in the old. Whatever care may be bestowed to select an identity of nutrition, aspect, and climate, the Grape on removal loses its former and special attributes. . . . No European plant retains its identity when transferred to American ground." *

The Grape-vine will not ordinarily do well without some kind of support. The usual one in this country, and about the best that could be adopted, is constructed as follows :—

Along each side of a pathway about ten or twelve feet wide, and running north and south, construct brick pillars, about fifteen inches square and seven feet high, at intervals of seven or eight feet apart. Between the pillars place a trellis-work of bamboo. Lay a beam or strong pole from the top of each pillar to the top of the one on the opposite side of the pathway, and in the centre of each beam fix a strong stake two or three feet high, in order to support a trellis of bamboo made to meet in the form of a pent-house roof over the path. Between each pillar plant a vine.

A grapery of this kind is in itself a great ornament to a garden, and if not made on too narrow a path, as is often the case, a most pleasant place for a stroll, when the sun is too much up for a walk elsewhere. Potted plants also that require shade can often be put along the sides of it, between the pillars, with great advantage.

The training of the vine is a very simple matter. Its figure, properly trained, may be aptly likened to a huge gridiron standing upright with its handle stuck in the ground, its topmost horizontal bar removed, and the vertical ones two feet apart. The young shoots near the base of a vine are easily bent and secured so as to grow in to this form; and all wood but what conduces to give it this form should be cut away at the proper pruning season. Upon these bars young shoots will put forth in March, each bearing two or three bunches of Grapes. These fruit-bearing shoots will go on growing and lengthening till the cold season arrives, when they must be all cut back to two eyes; and at the same time all thin unripe wood that has been made, of about the thickness of a cedar pencil, be cut clean away. The vine will then present much of the naked gridiron form again. From the two eyes

* 'The Vine and its Fruit,' p. 4.

thus reserved young shoots in the following March will be produced, bearing their bunches of Grapes, which, in their turn, must be cut back to two eyes in the next cold season, and so on.

Were the annual fruit-bearing shoots not thus cut back to one or two eyes, but left at their full length, in the following season from every eye upon them fresh shoots would put forth, each bearing bunches of Grapes. The crop would be very great, but of very inferior quality, and the vine much exhausted and injured. In neglected gardens this is too often allowed to take place, year after year perhaps, till the plants become an intricate, unmanageable, and unproductive jungle. Fortunately the vine bears the knife well; and my recommendation is in such cases to use it unsparingly. Cut away everything, if needs be, till only the stump remains. This will put forth strong, vigorous shoots, which may be trained in the way above directed for a young plant. It will be of course at a sacrifice of all fruit for the first season, but the gain a year or two after will be immense.

The cultivation of the Grape-vine in this country is conducted all but in the same way as that adopted with the Peach. About the third week in October, when the rains are fully over, the soil is removed from the roots, and they are allowed to remain bare a month or two. By this time the leaves will have fallen, and the trees should then be pruned. In the beginning of February, just before the vines put forth their new shoots and blossoms, fill in over the roots any description of rich manure that can be obtained, although perhaps nothing can be better than old cow-manure, or well rotted night-soil. Fish, when obtainable, is strongly recommended. A compost which I have found excellent for manuring vines is made thus :—

A large deep hole is dug in the earth, into which plenty of fresh cow-dung is thrown. A quantity of oilcake (khurree) is boiled in an earthen pot over the fire till dissolved. This, with an equal quantity of molasses (*goor*) and a small portion of lime, is thrown into the hole containing the cow-dung, and well stirred up. The hole is then covered over and allowed to remain so a month or two, only being opened occasionally for stirring up the contents. This compost must be applied to the roots of the vines. It has a most offensive smell; but if earth be thrown over it—fresh earth, and not the old soil that had been removed—the bad smell will soon pass off.

From the time the fruit sets, and as it increases in size, water should be given to the roots constantly and in great abundance. When the Grapes are just about ripening, irrigation should be discontinued entirely. It is a matter of consequence that the ripening take place before the approach of the rains, or the fruit, under the influence of much wet, becomes liable to burst. Mr. L. Berkeley had vines in his glass conservatory at Lahore; and by thus protecting his Grapes, told

me he was enabled to preserve them a much longer time than he could otherwise have done.

In the "Ram Newas" Garden at Jeypore several of the best Cabul Grapes were introduced some years ago, and cultivated with great success on the 'bush' system. Even the common country varieties treated in this way produced fruit superior to that yielded by the trained plants. For this method of cultivation, select an open piece of ground, and plough it up deep, and then level it. Then mark it out like a chess-board with ten feet squares, and where the lines meet, dig holes three feet deep and three feet in diameter; fill these with a rich compost of cow-dung, night-soil, black earth and river sand, and in each of these plant at the end of February a single plant of the stock raised from cuttings put down in the previous November. As soon as these begin to grow, the shoots must be unsparingly cut back each time to within a single eye, and the plants grown in the form of a bush. This must be done for the first two years, and no fruit allowed to set. At the annual general pruning, they should be cut back unsparingly, and each plant reduced to three, or four at the most, main shoots. In the third year after this treatment the yield from each plant will be very large, and the quality very superior. The shoots must not, however, be allowed to grow long and straggling, but cut back so as to keep the plants in the form of bushes. The bunches of Grapes will be so large and heavy as to need support, for which purpose forked stakes should be used. The soil round the roots must be raised like a mound, and have a sort of drain running round it. This will retain the water so necessary when the fruit is swelling. A plot of ground so planted with choice varieties of Grape can be easily and advantageously irrigated like a field crop. In fact, this is how four plots planted in the "Ram Newas" Garden were watered. The advantages of this method of cultivation are: (1) saving of expense in the erection of a vinery; (2) saving of labour in pruning and training; (3) economy of space; (4) facility of handling the plants; (5) increase of yield; (6) increase in the size of bunches and fruit, and improvement of quality and flavour.

The vine is readily propagated by cuttings. These are best made, perhaps, and put down at the time of the annual pruning at the end of November. They should be laid slanting-wise in the soil, with about two buds above the surface, and the earth well pressed upon them.

When the plant is of a choice kind, or one that it is desired to make the most of, it may, as is usually done in England, be multiplied by single eyes. For this purpose, wood of the current year's growth is cut into pieces of about two inches in length, each with one bud in the centre, and split in half. The half bearing the eye is laid firmly in a horizontal position, with the eye uppermost, upon a light mellow soil and covered with fine sand, so that all but the eye is buried. This

mode of propagating the vine has been adopted with great success in the Punjab, but I believe it is not the practice there to split off half the wood.

In India, the Grape-vine seems capable of being made to bear fruit at very variable seasons. No person, however, whose object is to obtain from his vines the richest flavoured fruit they can produce, will endeavour to ripen them at an untimely season. The driest and hottest period of the year is when Grapes ripen finest. This will be March in the Deccan, May in the vicinity of Calcutta, and June in the Upper Provinces.

Sir E. Tennent gives this very interesting piece of information respecting the culture of the vine in Ceylon, which may perhaps lead to important practical results in the cultivation not only of the vine, but of several other fruit-trees in this country.

"Mr. Dyke has succeeded in cultivating the Black Grape of Madeira trained over a trellis—the want of winter-rest for the plant being supplied by baring the roots and exposing them to the sun. The vines give two crops in the year, the principal one in March, and the second in September; but the operation of stripping the roots is only resorted to once, about the time of pruning in July."*

AURANTIACEÆ.

Triphasia trifoliata.

Cheena Narunga.

A small, unpretending thorny shrub, native of China; bears small white fragrant flowers. The fruit, which is spoken highly of by some authors, both in respect of its flavour and its excellence for preserving, is about the size of a large Black Currant. It encloses a stone which fills nearly the whole of the centre, leaving room for a small quantity of juicy pulp of an agreeable aniseed-like flavour. It can, notwithstanding, be hardly regarded as better than a mere berry. The plant, which is almost constantly bearing, produces its crop principally in February, when the bright red fruit gives it rather a pretty appearance. It may be propagated either by seed or by cuttings, put down in February.

May be grown on the hills in a green house.

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* Sir E. Tennent's 'Ceylon,' vol. ii, p. 539.

Cookia punctata.

WAMPEE.

A small tree, native of China; rises to about twenty feet in height; is of rather handsome growth, with fine luxuriant foliage; blossoms in the early part of April with small dense bunches of whitish sweet-scented flowers, and ripens its fruit in June. The fruit is borne in clusters, and when ripe resembles a diminutive Lemon, being about the size of an acorn, with a rough orange-like rind. It contains three large seeds, which nearly fill the interior. The small quantity of juicy pulp between the seeds and the rind is of an aniseed-like flavour. In the vicinity of Calcutta, where the tree is not uncommon, the fruit can hardly be considered better than a poor unserviceable berry. Possibly in China, and in other localities more congenial to it, a more palatable fruit may be produced.

A variety, however, is met with, I understand, in some gardens in Bengal, but not common, which bears a fruit of quite a dark colour, and of much superior quality to the green kind.

Plants may be propagated from seed or by cuttings put down in the rains. They grow well in all parts of India.

Cannot be cultivated on the hills.

Feronia elephantum.

WOOD-APPLE—ELEPHANT-APPLE.

Kaitha—Kuth-bêl.

A common jungle tree of this country. The fruit is round, of a pale green colour, and about the size of a cricket-ball. When the hard shell-like rind is cracked, the interior is found full of a brown, soft, mealy kind of substance, rather acrid, having a strong smell of rancid butter, and by no means palatable. It ripens in October. Dr. Wight says: "The pulp of the fruit affords a very pleasant jelly, so closely resembling black-currant jelly, as to be only distinguished by a trifling degree of astringency." The jelly, however, I have prepared from it appeared to me to possess rather the flavour of Apple, with a sharp cider taste, and to be such as it is not likely would be approved of by many.

The tree may be propagated by seed or by cuttings put down in the rains, but it is not entitled to a place in the garden.

Not grown on the hills.

Ægle Marmelos.

BALE-FRUIT—BENGAL QUINCE.

Bêl-phul.

A small tree, much covered with sharp spines, native of this country, and common in most parts of India.

The fruit varies much as to size. The largest are sometimes seen bigger than a man's head, while those of the ordinary size are not much larger than a cricket-ball; the very large ones, however, are considered of not nearly so good a quality as those of a more moderate size. The rind consists of a thin, pale green shell, which it requires considerable force to crack. The interior contains a soft, yellow substance of peas-pudding-like consistency, intermingled with a limpid kind of slime, of a very fragrant scent, and of a flavour very agreeable to those accustomed to it. The high reputation it bears for its medicinal properties induces many to partake of it, and those who do so usually become remarkably fond of it. It is in season principally during the months of January and February in Bengal and a month later in Upper India.

The tree may be propagated either by layers or by seed put down during the rains. I am not aware that any trouble is ever taken to improve it by cultivation.

Not grown on the hills.

Citrus Aurantium.

ORANGE.

Kumla Neeboo.

Narungee—Sungtura.

The Orange is a native of India, and grows in nearly all parts of the country except in Lower Bengal, within a region about one or two hundred miles from Calcutta. Even as high as Purneah, I understand, though the tree bears fruit, it never ripens it.

In Europe the varieties of Orange are numerous, but in India there do not appear to be more than three or four varieties in ordinary cultivation.

1. The SYLHET ORANGE: a round, plump, thin-skinned fruit, answering very much to the description of that so common in England, and known as the China Orange. This fruit is brought down during the cold months in great abundance to the Calcutta market from Sylhet, to the hills in which locality its growth seems in a great measure confined.

2. An ill-shapen fruit, with a thick, deep-coloured rind, much larger than the pulp can fill out, in this respect resembling the Mandarin Orange as well as in its scent and flavour, but differing from it in form, and in being of nearly four times the size. This is the variety cultivated almost exclusively in the Upper Provinces and in the Deccan of India.

3. A small Orange, not larger than a Plum, and bearing to other kinds much about the same relation that a Crab does to an Apple. The tree, however, in full bearing is a very pretty object, and the fruit, though fit for little else, makes an excellent preserve.

4. A kind much resembling the Sweet Lime; an insipid and worthless fruit.

The SEVILLE ORANGE: **C. vulgaris.** Mr. W. Stalkart has this variety in his garden at Gooseree, where he tells me it bears fruit abundantly. This kind, from which in Europe the finest marmalade is made, appears to be the only one that does thrive and bear fruit in the vicinity of Calcutta.

According to General Jenkins, "the Oranges of Sylhet grow from the foot of the mid region of the Khâssya Hills. The ground is rocky débris of limestone and sandstone. The best Oranges are said to be the produce of the upper groves—a thin-skinned and so very delicate Orange, that it ought to be procured in the vicinity. There are as good Oranges to be had in several parts of Assam."* The General, moreover, says: "At Nagpore Oranges blossom in February and March, and ripen their fruit in June and July. They blossom again in the end of July and August, for the cold weather crop, which lasts till March. The Nagpore Sungturas are undoubtedly the finest Oranges in India. They are of two colours, orange and dark-green; both thin and loose-skinned, and of great size and exquisite flavour."†

In reply to my inquiry on the subject of these Oranges, Mr. A. Ross, formerly Secretary of the Agri-Horticultural Society of the Central Provinces, kindly favoured me with the following communication:—

"The Nagpore gardens are still famous for their Oranges. I have been over most parts of India, and never saw finer. The trees under very favourable circumstances attain a height of twenty to twenty-five feet, covering a space of the same diameter, and are prolific bearers, the branches having frequently to be propped up to prevent their breaking down with the weight of the fruit which clusters on them, as if piled in a basket. They are propagated both by budding and grafting-by-approach. The former method is preferred. Both sour and sweet lime stocks are employed. The plant bears fruit in the third

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* MS. † Ibid.

year. After the rains are well over, in October, the roots are opened out for a space of about four feet in diameter and nine inches or a foot deep; all their fibres are removed, and after about a fortnight's exposure, the holes are filled in with well-decayed cow-shed manure or night-soil.

"The great enemy of Orange cultivation is a grub which attacks the tree when five or six years old. It perforates the stem, where the branches divide, and working up through their cores, causes them to wither, as if by blight. Native gardeners make a great secret of the remedy for this pestilence; but it is nothing more than pouring into the orifice made by the insect a small quantity of Assafœtida and Buckh (orris-root) boiled in oil, which has the effect of bringing the insect to the surface, when it can be picked out by a thorn or pin.

"The Oranges are not of two colours, but you have been correctly informed that there are two crops. The blossoms of the first crop (*Ambeeabar*, from their coming in with the Mango blossoms) appear in February, and the fruit ripens in November, lasting on the trees till January. The tree flowers again in the beginning of July (*Mirigbar*, from the setting in of the rain season), and the fruit ripens fully in March and April. The Oranges of this second crop are the sweetest, and coming in at the beginning of the hot weather, they are in great demand, and are plucked early in March, and even in February, while the rind is yet green. Hence the impression that the fruit is of two colours.

"The Nagpore Oranges were introduced by Raja Râghojee II from Ourungabad and a place called Seethakolee. The Ourungabad stock is distinguished by a peculiar formation of the fruit at the peduncle where it rises in the form of a nipple, having a marked depression all around. The Seethakolee Orange is quite round. Both descriptions are of two distinct kinds, *viz.*, the *Sunthura*, or thin, smooth, and close-rinded; and the *Koomla*, or thick, rough, and loose-rinded. The latter are the largest, being sometimes as much as five inches diameter.

"I believe that the double crop is owing to a peculiarity in the Nagpore Orange. It has retained that peculiarity when removed elsewhere; though, in the very limited number of instances in which it has been removed, the fruit has been found to deteriorate.

"I was recently down at Bombay, where I found in a Parsee nurseryman's garden a description of Orange that I had never seen before. It is in colour and appearance very like a Sweet Lime—quite as juicy, but slightly acid, and fully as large as our largest Oranges: indeed it looked like a young Pumelo! The Parsee said he had a sour variety of this Orange; but this is a fruit not uncommon here, known as the *Jumbairee Leemoo*. It is exceedingly sour, but not distinguishable from the Seethakolee Koomla Orange except by the taste."

Mr. L. Berkeley likewise states, "There is a variety of Orange grown at Delhi which fruits twice a year; it is called *Doomrajee*, and is so much valued that plants are very difficult to obtain."* Upon this Mr. Ross observes that he does not remember seeing the Doomrajee Oranges at Delhi later than March.

Some years ago Orange-trees of as many as six kinds were introduced at Goojranwalla in the Punjab, where they throve well and bore abundantly. They were, 1—The Tangerine, the small flattish variety so called in the fruiterers' shops in London, sometimes quite diminutive, of a fine perfume, occasionally mistaken for, but quite distinct from, the Mandarim; 2, St. Michael; 3, Small Blood; 4, Large Blood; 5, Large Oval; 6, Large White. These trees, procured originally at great expense by Colonel Clarke, appear to have been much neglected; and no means have been taken to propagate them. By a late account given of them by Mr. Brandreth, in the Blood kinds the blood colour is gradually dying out, owing, he considers, to want of due culture.†

Oranges of two or three kinds also have been introduced from Malta by Dr. Bonavia at Lucknow, where they have been propagated and distributed freely.

It does not seem that even in Europe Oranges are subjected, like other fruit-trees, to a regular course of pruning, but are left pretty much to themselves; and such is invariably the case in this country. No tree makes wood more freely after severe cutting in than does the Orange. Hence it may be early trained into any desired form without much interfering with its productiveness; seeing likewise that it bears its flowers upon wood of one year old and upon the new shoots.

In Europe the application of manure to Orange-trees is considered indispensable to keep up their fertility; and refuse of every description that can be turned to account for the purpose, according as it is available, is made use of. Hence it may be said to feed strongly. Dr. Bonavia recommends "each tree should have a good top-dressing of rotten night-soil every rainy season."

It may be useful to note here that the entire Citron order thrives best in a soil abounding with lime. Therefore, after the annual pruning in January, any kind of old mortar or lime rubbish applied to the roots will be found very beneficial. In fact, the more lime rubbish there is in the soil, the better will the fruit be. Copious watering is essential during the months of March, April, and May.

"All the Orange tribe," it is stated, "may be easily propagated by cuttings or by layers; but they rarely make satisfactory plants.

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* 'Proceedings of the Agri.-Hort. Society of the Punjab.'

† 'Proceedings of the Agri.-Hort. Society of the Punjab,' June, 1866, p. xxvi.

The usual and far better way is to graft a bud upon seedlings of the Lemon raised for the purpose. The seeds germinate in about a fortnight, and the plants will be ready for grafting upon in the course of the same year."*

Dr. Bonavia considers best for stocks seedlings of the common country sour Orange, when about a year old; and mentions February and March as by far the most favourable time for the operation of budding.† The sweet Lime is largely used by the mâlees of Delhi for budding upon. I have found Oranges budded on this stock sweeter and better flavoured than those budded in the sour Lime. The seed should be sown in February.

The Orange cannot ordinarily be successfully cultivated on the hills.

Citrus decumana.

PUMELO—POMPOLEON—POMPELNOSE.

Batâvee Neeboo—Chukotura.

This fruit grows to perfection in some parts of Lower Bengal and in Upper India.

The fruit grown in Calcutta and its immediate neighbourhood that I have tasted has been mostly tough and dry, and poor in flavour, but that from some of the gardens about Chinsurah and Hooghly has been pulpy and full of juice of the most agreeable flavour. The fruit is, however, often condemned when the fault lies in its having been gathered too soon. It is the better for being left as long as possible on the tree. It is in season from August to October in Lower Bengal, and from October to December in Upper India.

Dr. Macfadyen in his 'Flora of Jamaica' describes two varieties: ‡

"α. Maliformis: of which the fruit is globose, with the pulp of a pale pink colour, approaching to a very light yellow.

"β. Pyriformis: of this the fruit is more or less Pear-shaped, and the pulp of a crimson colour more or less intense. This variety is the most esteemed, being sweet and juicy, and having only in a slight and palatable degree the acidity which abounds in the first."

We have both varieties, that with red pulp and that with pale yellow, equally common here. But no such distinction exists between

* 'Le Bon Jardinier' pour 1866, p. 378.

† 'Journal of Agri.-Hort. Society,' vol. xiv, p. 199, where see an excellent practical paper upon the cultivation of Malta Oranges. ‡ Vol. i, p. 131.

them as Dr. Macfadyen has above indicated, either as regards the form or merit of the fruits. The Pear-shaped form, which some fruits take, seems merely an accident of growth, both that and the globose form being often found at the same time upon the same trees of either variety. The fruit has also been distinguished as—

1. POMPOLEONS or PUMELOS, when of the largest size.

2. SHADDOCKS, those of intermediate size; after the name of Captain Shaddock, who first introduced them into Europe from China.

3. FORBIDDEN-FRUIT, when somewhat larger in size than the largest Orange, with pulp of the colour of that of a Lemon, and rather acid. This variety, often seen in the fruiterers' shops in England, I have never met with in India. They call this, however, Pumelo, giving the name of Shaddock indiscriminately to the two first kinds.

AMOY-PUMELO is the name of a variety sent in the year 1851 from China by Mr. Fortune to the Agri-Horticultural Society, and described by him as "the finest fruit of the kind in China."

CANTON PUMELO is the name of another variety sent also about the same time by Mr. Fortune. Neither of these two varieties have fruited, but remain in an unthriving condition, as though the climate did not suit them.

Its cultivation is simple. Dig a hole 3 feet deep and 3 feet in diameter, and fill up with cow-dung manure, old lime or mortar rubbish, and ordinary garden loam, in equal proportions, and plant the tree. When the fruit is setting in March, and for the next two months, it needs copious watering. If these instructions are attended to, the fruit will be very delicious. The opening of the roots in January and afterwards covering them with a rich soil would be as beneficial to this as it is to all other fruit-trees. A dressing of salt to the roots of the trees I have been told by a friend, who tried it upon several in his garden, has a surprising effect in improving the quality of the fruit, rendering it tender as an Orange, and all but bursting with juice.

Plants are usually propagated by gootees, or by layers made in pots supported on high among the branches by a bamboo scaffolding. Plants raised from seed sown in February make equally good plants, though they take longer to come into bearing. It can also be propagated by budding in February and March on the common "Khutta," or sour Lemon.

Any tree had better be spared from the garden than the Pumelo. Its fine foliage, the large and fragrant flowers it bears in February, and the noble fruit hanging from its boughs long afterwards, render it a truly ornamental object.

The plant cannot be cultivated on the hills except under shelter of a glass house.

Citrus Japonica.

KUMQUÂT—OTAHEITE ORANGE.

A small tree, native of China, of recent introduction into India. The fruit resembles a diminutive Orange, about the size of a Lichee, and is produced in great profusion during the cold months, rendering the tree upon which it is borne an exceedingly ornamental object to the garden. A very fine preserve is made from it by the Chinese. It may be propagated by layers or seed. But Mr. Fortune observes, "in order to succeed with it as well as the Chinese do, one little fact should be kept in view, *viz.*, that all the plants of the Orange tribe which bear fruit in a small state are grafted."* It should be cultivated the same as the Orange.

Not grown on the hills.

Citrus acida.

LIME.

Khutta Neeboo.

Of the Lime there are several varieties, but it is hardly worth while, especially where the Lemon is also cultivated, to allow room for more than two or three of them in the garden. The trees are the least ornamental, and the flowers the meanest and least possessed of scent of any of the Citrus genus.

1. *Pâtee:* a small round fruit, esteemed by the natives highest of any.
2. *Kâghuzee:* of the size and form of a hen's egg; ripens of a pale lemon colour, the one perhaps in most general cultivation of all.
3. *Gora:* a small oval fruit, much cultivated.
4. *Cheenee Gora:* a sub-variety of the previous one, and reckoned superior to it; of the size of a large Orange, thin-skinned and fine-flavoured.
5. *Kamuralee:* a large handsome fruit, of pale lemon colour, and of about the size of a Cocoanut.

Besides the above, Dr. Voigt describes the following three, with the merits of which I am unacquainted:—

6. *Rungpore:* a round, smooth-skinned fruit.
7. *Taba:* a large, globose, spongy-skinned fruit.
8. *Arabian:* a large thick-skinned sort.

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* 'Tea Districts,' p. 122.

9. A very pretty variety, growing in Baboo Jibbon Kissen Paul's garden at Hooghly, bears perfectly round Lemon-coloured fruits, in size little larger than a marble.

10. A variety in the same garden bearing fruit of the form of a Nutmeg, and but little larger. These two varieties I understood were introduced originally by Mr. F. Pareira from China.

The Lime is easily propagated by layers or by sowing the pips. Varieties, such as the two last, are perhaps best budded or grafted on stocks of some kind of stronger habit.

Citrus limetta.

SWEET LIME.

Meeta Neeboo.

The fruit of the Sweet Lime is of the form and size of a moderate-sized Orange, with very smooth, pale-green rind. It has scarcely any flavour perceptible besides that of sweetness, but being in season during the hot months of August and September, when Oranges are not procurable, it is found very refreshing and agreeable.

Young plants are raised from sowing the pips, or those that come into bearing earlier by layering. It is used largely by the mâlees of Delhi for budding the Orange upon.

Citrus limonum.

LEMON.

Korna Neeboo.

The varieties of Lemon grown for distribution in the Gardens of the Agri-Horticultural Society are :—

1. The common Spanish so much used in England. This is not altogether similar in shape to the European fruit. The tree is very valuable for being in constant bearing all the year through.

2. *Burton's;* peculiar for the large beak with which the fruit terminates.

3. The (so-called) large Lemon.

4. The NINGPO : plants and seeds of this were sent in the year 1854 by Mr. Fortune from China, with the following remarks : * —

" I draw your attention more particularly to the Ningpo Lemon, a fruit which is much esteemed by the Chinese on account of its fragrance. In

* 'Agri-Hort. Soc. Journal,' ix. 100.

the autumn, when this fruit ripens, it is met with in all the houses of the rich. An ornamental plate of old China, on a stand, is filled with the fruit piled one above another, and placed upon a table in the hall or reception-room; here it remains for several weeks, and diffuses a delicious perfume throughout the house."

The plants sent by Mr. Fortune do not appear to have fruited satisfactorily since they have been introduced.

Plants of all varieties of the Lemon may be raised from pips or by layering.

Citrus medica.

CITRON.

Beg-Poora.

The fruit of this tree is well known for its great size, as well as for its dense spongy rind, from the external portion of which such excellent preserve or marmalade is made; the leaves are peculiar in not having, like most of the Citrus genus, winged footstalks. There are three well-distinguished varieties met with in this country, and possibly there may be more that I am unacquainted with. The fruits all terminate in a blunt-pointed beak.

1. The Common Citron, of the size of an ostrich egg, or somewhat larger, much knobbed and warted.

2. A Citron of enormous size, full a foot or more long. This seemingly is the kind known in Europe as the Poncire.

3. The fingered Citron, a curious fruit, resembling a man's hand with the fingers bent up with cramp; not uncommon in the North-West Provinces, but I have not seen it near Calcutta. It has been stated that the rind of this variety is very fragrant, and that the Chinese place it on dishes in their apartments to perfume the air. I perceived no very powerful fragrance in the fruits I used to gather from my garden in Ferozepore.

The Citron is usually propagated by seed and layering.

In Assam a curious plan is adopted to bring the Citron to perfection. When the fruit is as yet but small, the branch that bears it is bent down, so that the fruit may be lowered into a large earthen vessel with narrow aperture, sunk for the purpose in the ground. The fruit which, the natives say, if left in its natural position on the tree would never become large, confined in that situation grows to a prodigious size, and completely fills the vessel. When extracted from the vessel, which of course must needs then be broken, it diffuses a wondrous perfume.

MELIACEÆ.

Lansium domesticum.

LANGSAT OR LANSEH.

Native of Java and of the Moluccas.

Mr. Low in his work on Borneo describes the fruit of this tree as "pulpy, aromatic, and delicate, produced in bunches from the stem and branches of the tree." And Dr. Ward says of it: "This delightful fruit is the produce of a large tree. It grows in clusters; each is about the size of a cricket-ball. The brownish thin skin being broken displays the pulp in six cloves of a pleasantly acid taste, enclosing a greenish kidney-shaped seed. It is by many reckoned the finest fruit in the Peninsula. The month of July is the season at Malacca in which it is had in greatest perfection." * Dr. Voigt mentions the plant as existing in the Calcutta Botanical Gardens, but doubts whether it has ever flowered. I understood from the mâlees that two trees were growing there in Dr. Wallich's time which bore fruit abundantly, but that they died long since. Dr. G. King, writing in 1888, says: "It is in good health, but does not flower."

ANACARDIACEÆ.

Mangifera Indica.

MANGO.

Âm.

The Mango, in its uncultivated state, rises to become a forest-tree of stately growth, with wide-spreading, noble foliage. It is a native of India, where it may commonly be seen in the outskirts of villages, in large topes, under the sombre shade of which the traveller is wont to find shelter from the rays of the midday sun.

The cultivated Mango, however—that which has been propagated by cutting or graft—becomes altogether dwarfed in character, attaining then to a size not too large for it to find a place in the orchard or garden.

The Mango-tree blossoms about the middle of February, with panicles of small greenish flowers, which for a week or two scent the air for some distance around with rather a heavy but agreeable fragrance. The fruit of most kinds begins to come into season towards the middle of May.

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* 'Our Tropical Possessions in Malayan India,' by J. Cameron. Appdx. i.

The fruit of the Mango is generally of an oval form, somewhat flattened, and with a kind of heel, or "nose," near the apex. There is no fruit of which the several varieties vary more in size, the smallest being no larger than a pullet's egg, and the largest attaining to the size of a small Pumelo. They are equally distinct also in quality and flavour. The worst have been, not inaptly, likened for flavour and consistency to tow soaked in turpentine; while the finest, having the soft bland consistency of blanc-mange, so as to admit of being eaten with a spoon, certainly rival, if not excel, any fruit in the world for deliciousness of flavour.

It would be almost impossible to describe or even to enumerate the various kinds of Mango found in India. Many, probably of exquisite flavour, are beyond access, existing only in private gardens, in remote parts of the country, known scarcely to any one but the owners; while the majority of those offered for sale, as well as those frequently met with in gardens, are of very inferior description, and unworthy of notice. All I am enabled to do is to mention such as have come under my own observation, as being fruits of high character, and to state the localities where they are to be met with.

The following are the kinds grown in the Calcutta Botanical Gardens:—

1. *Alphonso:* from the vicinity of Bombay; a Mango of high repute.

2. *China:* a small fruit, of little merit; remarkable principally for the tree bearing a second crop in October.

3. *Gopâl Bhôg:* from Malda; in high estimation; of moderate size, of a deep amber and orange colour when ripe, the flesh of livery consistency, of peculiar flavour.

4. *Kysapatee:* from Malda; a small fruit of rich, exquisite flavour.

5. *Langera:* an excessively large fruit, of inferior quality. It remains upon the tree and ripens a month or more after the season of other kinds is past. Probably this is the one described by Dr. Lindley, under the name of Dodol or Calappa, as "the largest variety, sometimes being as big as an infant's head, or middling Shaddock, weighing more than two pounds; called in Goa *Barera.*"*

6. *Large Malda:* a middling-sized fruit, of an olive-green colour when ripe, the interior of a deep orange colour; about the finest, if not the very finest of all. To those who have not partaken of it, no words can convey an idea of the merit of this exquisitely luscious fruit. It comes into season about the 20th of May. The Botanical Gardens are rather rich in the number of trees of this kind they contain.

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* 'Transactions of the London Horticultural Society,' vol. v, p. 113.

7. *Peter:* a moderate-sized Mango, of roundish form, with a projecting heel on one side. It ripens of a dull russet colour with a reddish tinge, and may fairly be considered of first-rate merit, having a distinct taste of a ripe Gooseberry.

8. *Singapore:* a fruit of the largest size, ripening all over of a uniform greenish golden yellow; accounted by some a first-rate sort, but in my estimation of but secondary merit.

9. *Soondershaw:* a large fruit, when ripe very gorgeous in colour, of bright orange and vermilion; in flavour only a second-rate fruit at best; those produced in the Botanical Gardens are not even that.

Besides 10, *Arbuthnot*, and 11, *Moorshedabad*, with the merits of which I am unacquainted.

The following are the several kinds grown for distribution in the Gardens of the Agri-Horticultural Society :—

1. *Bombay:* or large Malda.

2. *Madras:* introduced thence, but originally from Bombay; a moderate-sized fruit, ripens of a straw colour, and is of very fine flavour.

3. *Gopâl Bhôg.*

4. *Kysapateé.*

5. *Bindobunnee:* a small egg-formed fruit of fine flavour; green when ripe.

6. *Bhutoora:* a small fruit of long and flattened form, ripens of a dark-green with vivid red streaks on the sunny side; the interior of a straw colour, very delicious, having a spice of aniseed in its flavour.

Besides the following of no great merit: *Goa, Chuckchukeea,* and *Feroghabunnee,* from Malda. *Arracan, Soondershaw, DeCruze's Favourite.* Also *Lucknow, Nâgroo, Davies,* and the three, *Tarse, August,* and *Madame,* from Mauritius; with the merits of which I am unacquainted.

The garden of Baboo Jibbon Kissen Paul, at Hooghly, contains, or did contain, in addition to many already described, a very choice selection of different kinds of Mango, of which I give an account below. I have been told, I must first state, by one who inquired about them of the Baboo, that he did not recognize the names of some. All I can say is, that if I am inaccurate in any instance as to the name, I am to a certainty correct in the description of the Mango to which the name is applied. The names I took down from the Baboo's mâlee with each fruit as I received it.

1. *Archâee* (Bombay): a fruit of first-rate excellence, ripening some time after the season for other kinds is over. The tree which bears it is remarkable for the purple or inky colour of the young shoots.

2. *Bêl Mango:* a very peculiar and curious description of fruit, of a flavour in no way distinguishable from that of the fruit whose name it has; the leaf also of the tree has a strong parsley-like scent.

3. *Bâtâvee :* a moderate-sized fruit of first-rate excellence, when ripe of a pale Apricot colour, the flesh of a pale primrose colour ; resembles closely in delicacy of flavour the "Madras" of the Agri-Horticultural Society's Gardens.

4. *Bôgul :* a very large cylindrically formed fruit, of a pale-green colour when ripe, the flesh of a butter-like consistency, and of a most delicious Apricot-like flavour.

5. *Kuchhâee Meethea :* a fruit remarkable for being sweet and eatable in its unripe state ; eaten pared like an Apple.

6. *Kâla Puhâr :* a first-rate fruit.

7. *Kelooâ :* a moderate-sized fruit, of orange colour, and fine gooseberry flavour.

8. *Kheera Chota* (Bombay) : a first-rate fruit.

9. *Kôput Bunga :* of moderate size ; in colour of a pale ashy-green, with a tinge of orange on the sunny side ; a most delicious fruit, second only in merit to the Malda.

10. *Mohun Bhôg :* a small red fruit of the very highest merit.

11. *Nâreech* (Bombay) : a very large whitish coloured fruit, ripens in August.

12. *Pheeta Khâs :* flesh of a pale straw colour, very sweet and luscious.

13. *Phoolee :* a small fruit, red outside ; flesh of primrose colour ; of exquisite flavour.

14. *Surees* or *Surees Khâs :* a long flat-formed fruit of moderate size ; when ripe of a dark-green on one side with stripes of red on the sunny side ; flesh of a deep orange colour, second only to Malda in fineness of flavour.

15. *Târâh :* a fruit of moderate size, flesh orange coloured ; of a fine acid flavour.

Besides, *Armân*, a very large handsome fruit, in colour resembling a Nectarine, but poor in flavour, as was *Asmantârah ;* two good country kinds, *Booree* and *Chhâeton Moora ; Mookh-Machee, Pyârâ-Khâs, Shah-pusand, Soondâleea, Phreet* (Bombay).

The Mango may be propagated readily enough from seed ; but Mr. Ingledew, who seems to have had much experience in the cultivation of this fruit in Mysore, maintains that—

"The produce of the seedling Mango is very uncertain, and less to be depended upon than that of most other seedlings in the quality of its fruit ; and it is probable that not one in several thousands of those trees will bear good fruit in ordinary situations." *

Opposed however to this, Dr. Jameson states respecting the Bombay kind that—

* 'Journal of Agri-Horticultural Society,' vol. i, p. 262.

"The seedling of the grafted tree gives fruit in five years, and is nearly equal to the grafted plant. It, too, will grow in many soils where the grafted plant will not succeed."*

Mr. P. Homfray likewise, in a communication to the Agri-Horticultural Society, mentions, respecting a fine variety of Mango introduced from Java, that of several seeds sown in his garden at Howrah, the trees raised, all without exception, bore precisely the same kind of fruit in flavour, appearance, and quality as that produced by the parent tree. He further adds:—

"Mr. J. Homfray has likewise in his garden a grafted tree, received from the Botanic Garden, of the Mazagon Mango, stones from the fruit of which he planted, and one or two of the trees raised therefrom produce fruit exactly alike, and fully equal in every respect to the fruit of the parent tree."

Major W. Stokes also states the same of a peculiar sort he found at Kyak Phyoo.

In a conversation I had with Mr. P. Homfray, many years after he made the above communication, he told me that he had since sown the seeds of other kinds, but had not met with the same result from them. The seedlings did not yield fruit equal to that of the parent tree. The Java kind, however, always came true as a seedling.

I have it from General Jenkins that "the natives say, that for seed you should skin the fruit, leaving all the pulp about the stone, and so throw it into milk, and there let it remain for three days, and then take it out and plant it."

The mode of propagation almost always resorted to is by inarching. Stones are sown at the time the fruit is in season, and the plants raised from them are potted off into single pots to be inarched upon on the setting in of the rains in the second year after. At the close of the rains the union between the graft and the stock will be complete; and the plants should then be separated and removed to some shady spot, where it is well to keep them till the following rains, that they may become thoroughly established before planting out. Grafted Mangoes come into regular bearing when about five years old.

The Mango, like all other fruit-trees, is much benefited by having the earth around it removed, and the roots left exposed for a space of two or three weeks. This should be done in November, and in December the roots should be well supplied with manure, and then covered in again with entirely fresh earth, and not that which had been previously removed. Likewise, when practicable, during the month of April, when the fruit is swelling, copious drenchings of the soil around

* 'Report of Botanic Gardens in N.-W. Provinces for 1854.'

the stem with water or liquid manure is of great advantage. The Mango usually makes two growths in the course of the year, one about the end of February and another in July. It sometimes makes a third one in October; when it does so it may be pretty well decided that the new wood then formed will produce no blossoms at the usual time in February.

In the neighbourhood of Calcutta, when the trees are in full blossom, nothing is considered so prejudicial as the morning fogs prevalent at that season. When they occur to any great extent, nearly all the flowers drop without setting fruit.

The two principal localities in India where Mangoes of the finest description are said to be produced are Mazagon at Bombay, and Malda; but to what circumstances the superior merit of the fruits raised in those spots is attributable, whether to any peculiarity in the soil or climate, or to some particular mode of cultivation, it seems hardly possible to decide.

It is useless to attempt its cultivation on the hills, except in a hot house.

Spondias dulcis.

OTAHEITE APPLE.

Bildetee Umra.

A small tree, native of Otaheite and the Friendly Islands, with handsome foliage resembling that of the ornamental Sumach of the English gardens. It blossoms with sprays of small yellow flowers about the beginning of March, and ripens its fruit in August and September.

The fruit, which has a large fibre-covered stone in the centre, is of the size and form of a large hen's egg, and of a deep amber colour, blotched for the most part with rusty russet like the colour of tarnished gold. Its appearance is very inviting, as is also its exquisite fragrance, resembling that of the Quince. To the taste, however, it is very acid, with a flavour like that of an exceedingly bad Mango.

Not much can be done with it in the way of cooking, either as a preserve or in a pudding. Don speaks of it notwithstanding in high commendation, and says that in its native locality it "is esteemed one of the most wholesome of fruits, and has almost the flavour of the Pine-apple; that it not only assuages thirst, but is given to the sick without distinction." He adds likewise that it has a "somewhat nauseous, fetid smell." Whence it would almost seem that the fruit grown with us cannot be that described under the same name by Don.

I am told by those who say they have often sown them, that the stones never germinate. Young plants are usually obtained by grafting upon seedlings of S. mangifera, the common country Umra.

Cannot be grown on the hills.

Spondias mangifera.

HOG-PLUM.

Umra.

A coarse-looking jungul tree, native of India, with leaves like those of the Walnut, which fall off in the cold season, when the tree remains bare and unsightly for two or three months.

The fruit, which ripens in October, when largest is of the size of a goose's egg, of a rich olive green, mottled with yellow and black, with but a trifling degree of scent, and none of the quince-like odour of the other species. The inner part nearest the rind is rather acid, but that being removed, the part nearest the stone is sweet and eatable. But withal it is not an agreeable fruit.

It is propagated readily by sowing the stones in September.

OXALIDACEÆ.

Averrhoa carambola.

Kumrunga.

A small tree, native of Moluccas; common in most parts of India; grows to the height of from fourteen to twenty feet; very beautiful and ornamental for its foliage alone, but especially so when in full blossom, with the crowded clusters of its small, pale, rose-coloured, ribes-like flowers. Dr. Bruce states that its leaves are sensitive, and even its branches.

The fruit is remarkably handsome, of the size of a Lemon, deeply ribbed or winged; when perfectly ripe semi-transparent and of a fine rich amber colour. Previous to becoming quite ripe it possesses a flavour somewhat between that of Sorrel and a green Gooseberry. When well ripened it has a very strong and agreeable scent, as nearly as possible like that of the Quince, as well as a very fine and peculiar flavour. It has, however, even then a degree of acidity which renders it hardly fit to be eaten raw. It does not bear cooking well, as it then becomes tough and horny; but when the tough part of the fruit is removed, the pulp affords a very delicious jelly. The fruit ripens towards the end of September, at which time the tree comes again into full blossom, and produces a second crop of fruit in January. It is propagated from seed.

Cheenee Kumrunga.

A variety of the above; bears a fruit smaller by about half, when ripe of a deep-green colour, and not nearly so handsome; without the

acidity of the ordinary kind, but also entirely without its fine flavour. This is always propagated by grafting upon stocks of the other.

Neither of the above can be cultivated on the hills.

Averrhoa Bilimbi.

BLIMBING—CUCUMBER TREE.

Bilimbee.

A small tree, native of Moluccas; common in the Deccan, but not often met with in Bengal. It has rather a stout trunk, and grows to about thirty feet in height. It comes into blossom about the middle of February, with pretty ribes-like bunches of flowers, and continues to blossom and bear fruit till the cold weather. The fruit is of the form and size of a Gherkin, with a smooth, thin, pale-green, translucent rind, like that of the White Grape. When ripe it is as soft as butter, and has somewhat of the flavour of an unripe Gooseberry, too acid to be eaten, except when cooked or pickled. When laid by a short time it acquires the scent of Strawberries, without, however, possessing in the slightest degree their flavour. It makes a very agreeable preserve. The way in which the fruit is borne on the tree is very singular, hanging merely by slight thread-like footstalks, in clusters of eight or ten, from the oldest branches, but principally from the trunk itself.

In the square within the cloisters of the Roman Catholic Church at Bandel, near Hooghly, is a row of remarkably fine trees. Propagated easily from seed sown in July; but the young seedlings are very delicate, and in the locality of Calcutta, unless kept in some warm sheltered place during the first two or three cold seasons, are all but sure to perish.

Cannot be grown on the hills.

LAURACEÆ.

Persea gratissima.

AVOCADO PEAR—ALLIGATOR PEAR.

SUBALTERN'S BUTTER.

A native of the West Indies; in this country a moderate-sized tree; but Humboldt states that near Caraccas he met with "enormous trees"

of Persea, and that it may be watered with either fresh or salt water. Though now tolerably common in Lower India, it does not appear to have been long introduced. The tree comes into blossom in the locality of Calcutta at the beginning of February, bearing sprays of very small pale yellow flowers; and bears ripe fruit from the end of August to the middle of September.

The fruit in outward appearance bears the strongest resemblance to a very large green Pear. In the centre is a stone of about the size of a Walnut. The fleshy part of the fruit around the stone is of a bright yellow colour, of the consistency of firm butter, and of the fine flavour of a fresh Walnut; this eaten with salt is very delicious. But Sir J. Paxton states that "however excellent when ripe, the Avocado is very dangerous if pulled and eaten before maturity, being known to produce fever and dysentery."*

In this country it is usually propagated by seed sown in September. Sir J. Paxton says that it may be struck from cuttings of half-ripened wood and planted, without mutilating the leaves, in sand under glass.

Not grown on the hills.

CHRYSOBALANACEÆ.

Chrysobalanus Icaco.

CALLIMATO-TREE: SPANISH NECTARINE.

ICACO—COCOA-PLUM.

The fruit of this tree is described by Don as—

"About the size of a Plum, ovate, roundish, varying much in colour, either red, yellow, but commonly purple; the pulp white, adhering firmly to the stone; the taste sweet, with some austerity, but not unpleasant; eaten either raw or preserved; sold in the markets in the West Indies."

A large handsome shrub, with dense foliage of blackish-green leaves, has existed in a flourishing condition for many years past in the Gardens of the Agri-Horticultural Society, and in the Royal Botanical Gardens, Seebpur, but has never yet fruited or blossomed that I am aware of. Dr. Lindley states that it "requires a cool moist soil to bring its fruit to perfection." †

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* 'Flower Garden,' vol. ii, p. 54.

† 'Transactions of the London Hort. Soc.,' vol. v, p. 78.

FABACEÆ.

Tamarindus Indica.

TAMARIND.

Imlee.

This large tree, a native of India, and so common in all parts of the country, produces its small yellowish blossoms in May, and matures its fruit in February. The varieties mentioned are :—

1. The Sour-fruited.
2. The Sweetish-fruited.
3. The Red-fruited.

The last of these, having the pulp of its pod of a rose-colour, is of highest merit, and is that which, when obtainable, is always employed for preserving.

Plants are always raised from seed, but whether the varieties may be depended upon to come true to their seed, I am unable to say. To make certain, however, of a tree of the best sort, as well as to render it of a size conveniently small for the garden, unquestionably the best plan would be to propagate a plant by means of a gootee. The natives have an idea that the Tamarind-tree renders the neighbourhood of the spot where it grows unwholesome.

DRUPACEÆ.

Amygdalus Persica.

PEACH.

Âroo.

The varieties of Peach cultivated in this country seem to me to be very few. Indeed, I know of only three between the fruits of which there is any material difference.

1. The Saharunpore Peach, cultivated generally in the North-West Provinces, is a very large, fine, sweet, and mellow fruit; but at the very best wanting, as it seemed to me, in the luscious and melting quality of the Peaches of Europe.

2. The Flat China is a very curious fruit, resembling in form a man's open hand without thumb and fingers, with a small round stone in the centre. It is not commonly met with in Bengal, though it is down in the list of the Agri-Horticultural Society, and is cultivated in the North-West Provinces as commonly as the Saharunpore, which in flavour and quality it closely resembles, though perhaps a little inferior.

It has the merit of ripening better, and at times when the other often fails to do so at all.

3. The Calcutta Peach, of which the varieties mentioned hardly differ but in name, is more of the cling-stone description, and has much more of the melting quality of the Nectarine than the two preceding. It is of a blood-red colour next the stone, and has always a smack of bitterness in its flavour more than is quite agreeable. I may here state that I form my opinion of this fruit not merely from such as is usually sold in the bazâr, but from the samples I have tasted of two or three so-called varieties in the Agri-Horticultural Society's Garden; but more particularly from a basket of remarkably fine Peaches presented to me by Mr. W. Stalkart from his garden at Gooseree.

I strongly suspect this Bengal Peach is little else than the fruit as it is produced in its wild condition; an opinion in some degree confirmed by the statement of Mr. Hampton, on presenting some Peaches from his garden at Howrah generally admired for their size and beauty, that they were the produce of trees not grafted, but raised from seed.*

In this country the Peach makes such vigorous growth of wood, that shortly after the close of the rains some artificial plan is necessary to be adopted to assist in ripening it. For this purpose the earth should be removed from round the stem to the distance of perhaps a foot and a half, and the roots laid bare, and be allowed to continue so during five or six weeks If the trees have made great growth during the season, pruning of the roots will conduce greatly to the ripening process. After this drying of the roots by exposure to the air is over, and not before, while the new wood is as yet full of sap, the trees should be pruned. The pruning of the Peach-tree consists merely in cutting out the wood according to the form in which it is desired to train the tree, and in shortening the bearing wood (which is that of the same year's growth) to six or seven buds.

After this it is the usual practice to cover the roots with some rich manure or compost. But the plan I have adopted, in my opinion preferable, has been to cover the roots again with dry earth, and so leave them without the application of anything wet or of an exciting nature till the trees have blossomed and set their fruit, which they generally have done by about the middle of February. I then immediately remove the earth again, and apply new soil well enriched with old stable or cow manure. At first a sparing application of water is given, which should be increased in quantity as the fruit grows larger, and then be supplied in abundance continually till just before the fruit ripens, when it must be withholden entirely.

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* See 'Agri-Hort. Soc. Trans.,' vol. viii, p. 390.

In the North-West Provinces the expediting of ripeness in the bearing wood that it may blossom early is of the utmost importance; for if the fruit be not formed sufficiently soon to become ripe before the hot winds set in, it never becomes so, but remains on the tree then quite hard till it drops.

To propagate the Peach-tree the fruit stones are sown in the open ground in September or October, and in February the young plants spring up, which, according to Mr. Hampton, would give as good fruit and produce it nearly as soon as grafted plants.

However, for certainty it is always usual either to bud or inarch, the former process being as uniformly adopted in the North-West as the latter is in Bengal. The plants raised in February will be ready for either process by June or July; and the following cold season they will be ready for planting in the spot where they are finally to remain. They come into bearing in two years' time.

Another plan, which was adopted by the reviser of this edition in the Jeypore garden, was to sow the stones in June and July, and bud upon the seedlings in the February following, just before the buds begin to swell and burst into leaf. This was found to be more successful than the other, and is, in fact, practised by the native nurserymen in Upper India.

It is a great point in the cultivation of the Peach-tree to keep the roots as little below the surface of the soil as possible. This is sometimes effected by placing tiles underneath where the trees are planted. But caution must be taken against the adoption of this plan in the North-West Provinces; or, as happened with me, the strong winds, which uniformly follow two or three days of heavy rain, will be sure to uproot them.

"During my residence of more than forty years in India," remarks Colonel Sleeman, "I have never seen so bad a place for Peaches as Lucknow. I have many trees in my own garden here, but not one of them produces a fruit that would be tolerated at any other station in India, and those produced in the public garden are not a bit better. The Grapes here are as bad as the Peaches." *

Mr. W. M'Ivor gives the following very interesting information respecting the cultivation of Peach-trees on the Nilgherries:—

"It was remarked in my previous reports that the introduction of the best varieties of Plums and Peaches had proved a failure, inasmuch as these could not be induced to produce fruit. I have now much pleasure in being able to state that these are now more promising, some of the varieties having produced fruit, such as the Barrington and the late admirable Peaches, the Golden Drop, and the Greengage Plum.

* 'Journal of the Agri-Horticultural Society.'

This has been effected by placing the plants in partially shaded and damp situations, being quite the reverse of the site usually chosen for these trees in Europe." *

Amygdalus Persica *var.* lævis.

NECTARINE.

The Nectarine is generally considered to be nothing more than a variety of the Peach, the difference being that it is a cling-stone, and has a perfectly smooth rind, like the Apricot. All therefore that has been said regarding the cultivation of the one will apply alike to the other. At Ferozepore I never saw the fruit growing, but it used occasionally to be brought about for sale, so there must have been productive trees somewhere in the neighbourhood. It was, however, grown with great success in the Jeypore garden. The tree grows in the Gardens of the Agri-Horticultural Society, whence also young plants are distributed; but neither there nor elsewhere in the vicinity of Calcutta have I heard of fruit ever being produced.

Prunus Armeniaca.

APRICOT.

Zurd Âroo.

The cultivation of this fruit on the plains of India has nowhere, I believe, been attended with satisfaction. Nor has its introduction in the Nilgherries met with better success. Mr. L. Berkeley informed me that they had in the Saharunpore district trees of the Brussels or Breda kind, which bore fruit that was tolerably good to eat from the tree. Dr. Gibson states that it "blossoms abundantly at the level of Poonah, but does not ripen fruit."† The tree is found in some of the gardens about Calcutta, but not in a very thriving condition. Mention is made in the 'Journal of the Agri-Horticultural Society' of "an Apricot grown in his garden at Howrah, which Mr. P. Homfray considered a very good specimen of the fruit in point of size, being about four and a half inches in circumference."‡

In the same Journal it is also stated that "at the Horticultural Show of April, 1850, Apricots from Mr. Stalkart's garden showed satisfactorily to what perfection they may be brought." I have seen

* 'Report of the Otacamund Garden for 1858,' p. 18.
† Spry's 'Plants for India,' p. 63. ‡ Vol. *iii*, p. 56.

the trees in Mr. Stalkart's garden: they are small, and not very thriving. The little fruit they produce, Mr. Stalkart told me, though answering tolerably well for preserving, never ripened sufficiently to be palatable, eaten uncooked.

The Apricot, I am told by Captain I. Temple of Saugor, who had imported three kinds, the Beaugé, Moorpark, and Hemskerk, grows with amazing vigour when budded upon the Peach-stock.

It grows wild on the hills, where it can be brought to great perfection under cultivation. It is best to raise plants by grafting or budding, which is done in April and May on the hills. The cultivation is the same as that for the Peach.

Prunus domestica.

PLUM.

Aloocha.

The Plum has been grown in the vicinity of Calcutta a great many years; but of what variety it is difficult to say, for the plants have hardly done more than just set their fruit, and then drop them. A rather small dark kind of Plum, however, seemingly the fruit in its original wild state, is met with in most parts of India, and even as near Calcutta as at Hooghly. The fruit is uneatable unless cooked, but in that condition is very delicious in tarts, preserves, and puddings.

In the North-West Provinces plants of two or three varieties are issued from the Saharunpore Botanical Gardens; one in particular ripening of a fine amber colour. But these, too, were hardly palatable, except when cooked or preserved, and for this purpose they were equal to the finest European kinds.

I was surprised to find on the Nilgherries that the Plums grown there, though large handsome fruits, were nearly as unfit for the dessert as those produced on the plains in the North of India.

The general mode of cultivating the Plum in this country is as near as possible the same as that adopted with the Peach.

Dr. Riddel states that he never succeeded in budding the Plum on the Peach. At Ferozepore I made many buddings of the Plum on the Peach-stock, and found not the least difficulty in doing so. The plants, however, made such prodigious growth as to become quite unmanageable. It seems far preferable to bud upon seedlings of the Plum itself as stocks.

It is successfully cultivated on the hills in the same way as the Peach.

Prunus Bokharensis.

BOKHÂRA PLUM.

Âroo Bokhâra.

The fruit of this tree is well known in India from the quantities of it brought down annually in a dried state from Cabul. The tree itself thrives vigorously in the Upper Provinces, and is very common in gardens in the Punjâb, where it bears abundantly. The fruit makes a good preserve, but is only eatable when cooked. Cultivation same as for the Plum.

This is successfully cultivated on the hills.

Cerasus vulgaris.

CHERRY.

Every attempt to cultivate the Cherry in the plains of India has hitherto proved an utter failure. There seems not the remotest probability of its ever being brought to succeed in a climate so decidedly uncongenial to it.

Two or three species of Cherry, however, indigenous to India are met with in the hills. One, C. Jenkinsi, a native of Khâssya, thrives and bears fruit at Gowhatti; but such as is only eatable in tarts or preserved in brandy.

It is grown to perfection on the hills, with a little care. Propagated by seed sown in September.

POMACEÆ.

Cydonia vulgaris.

QUINCE.

Bihee.

The Quince-tree is not uncommon in the Upper Provinces. At Lahore it ripens fair-sized fruit at the end of June and in July, which is used for preserving, and is only eatable when cooked. Dr. Voigt states that the tree has been in the Calcutta Botanic Gardens many years without blossoming. Dr. Riddel says that the fruit is plentiful at Sattara, and that he has met with it at Poonah, and that he has seen the tree blossom elsewhere, but not produce fruit.

It is propagated usually by cuttings, which strike very readily.

It is largely grown on the hills, and cultivated like the Apple.

Pyrus malus.

APPLE.

Seb.

There are certain localities in India in which the Apple appears to be cultivated with complete success.

In April, 1837, Major Moore sent some Apples to the Agri-Horticultural Society from Hydrabad, remarking :—

"I have this day sent you a specimen of the Nonpareil Apples grown in my garden; and those which we have taken from the same tree have been fully as good as any I ever tasted in England. Some I have taken from the tree measured ten and a half inches in circumference."*

In Tirhoot, Mr. S. French is reported to have grown Apples of a superior kind in the year 1838. And at the Calcutta Horticultural Show in March, 1854, a few splendid, large, and well-flavoured Apples from Mr. William Moran's garden in Tirhoot were placed on the table.

In 1858 I tasted some very large specimens of an excellent Apple grown at Duronda in Chota Nagpore, sent to the Agri-Horticultural Society. These bore every resemblance to the Russet, so valuable for cooking purposes in England. In our gardens at Ferozepore we had a small and very delicious Apple, like the White Joanneting, but superior to it in flavour, produced in great abundance during the month of April. It is difficult to tell where this Apple originally came from. It seems to have been not at all known lower down the country, as a visitor from Umballa, who was with me during the time it was in season, told me he had seen nothing of the kind there. It is unknown also, I am informed, in the Punjâb.

Dr. Riddel enumerates as many as four varieties of Apple met with in the Deccan, namely, two English varieties :

1. The BROWN RUSSET (probably the kind before mentioned as sent from Duronda).
2. A yellow striped PIPPIN.

And two Persian sorts of a small description, commonly found in most native gardens in the Deccan :

1. One sweet and luscious, grows in bunches.
2. A larger, with a rough taste, better adapted for tarts.

A species of Apple, P. Indica, is found indigenous in the Khâssya Hills, of which ripe specimens were brought to me at Gowhatti in the month of February. They were of the size and form of the Golden

* 'Agri-Hort. Soc. Trans.,' vol. v, p. 21.

Pippin, of a deep burnished gold colour, spotted with crimson, and scarred a good deal with russet; and of a fine quince-like odour. They were too austere and tough to be eaten raw.

There are some localities, however, where it has been pretty well decided that this fruit cannot be grown with any degree of success. According to Dr. Gibson—

"The Apple attains some size in the higher level of Ahmednuggur, but it is not such as to be worthy of a rank with either English or tropical fruits."*

At Ootacamund, in the Nilgherries, where the Apple might very reasonably be expected to thrive to perfection, I met with nothing better than mere Crabs, both as regards size and flavour. At Bangalore, too, another locality seemingly most favourable for the growth of this fruit, several varieties were brought me for sale when I was there in April, 1859. But nearly all were unsound, and a most exorbitant price was asked for them. Since then there has been some improvement in the quality of the fruit cultivated in these localities.

At Calcutta the cultivation of this fruit has uniformly proved a failure. In the year 1850 some young Apple-trees were brought to Calcutta in a ship laden with ice from America. Being kept dormant by the cold of the ice, on which they were laid, they arrived in full health and vigour. They were purchased by the Agri-Horticultural Society, and have by this time become large thriving trees in their garden. They have blossomed often; but if they have set fruit, it has been only to drop it immediately afterwards.

Apples come to perfection in the Kangra Valley, whence they are exported in large quantities to the plains. Government Orchards have now been established in Kumaun, where Apples of choice English sorts are cultivated on a large scale, under the supervision of a European Gardener, and are largely exported to the plains. The Jhalna Apples are now well-known in the large stations on the plains, and in Calcutta itself; while every effort is being made to extend their cultivation in those parts, and on the Himalayan Sanitariums, such as Simla, Mussoorie, &c. The cultivation at these places is almost similar to that in Europe. On the plains, the plants are treated in the same way as Peaches. They flower in February and March, and set fruit which ripens in April and May. In January the roots are laid bare, and after an interval of a fortnight, filled in with good cow manure. Copious watering is necessary when the fruit is swelling.

Apple-trees in India are propagated by layering and grafting upon the common country variety. General Jenkins says: "Cuttings of Apple-trees may be planted in January and February, and in the

* Dr. Spry's 'Plants for India,' p. 62.

rains, near water. When they shoot strongly they should be planted out and cut down to two or three buds. Of these let the strongest shoot grow, and rub off the others. Train it up straight to about three feet, cutting it down when it appears to grow too fast, and rubbing off any side-shoot you do not approve. Graft in March."*

A gravelly soil suits apples best.

On the hills they can be cultivated to perfection.

Pyrus communis.

PEAR.

Nâshpâtee.

The Pear-tree thrives well in most parts of India. In Bengal as low down as Calcutta it blossoms, but never sets fruit; but in gardens at any distance beyond about a hundred miles higher up, fruit is often met with, of moderate size, very hard, and unfit to be eaten uncooked, but excellent for baking and stewing. Pears of this description, too, I learnt from General Jenkins, had been introduced from the Bootan Hills, where they are indigenous.

Any mellow and melting kind of Pear has not, I believe, been cultivated with success on the plains of India. Possibly Pears of this description may have been introduced; but as the Pear is a fruit which does not ripen upon the tree, but which, after being gathered, requires to be laid by some time in a cool place before it becomes mellow, it is not likely perhaps that in this country it can ever be cultivated with satisfaction for the table. In the Kangra valley and some of the lower ranges of the Himalayas, they are grown to perfection, and exported to the plains. Young plants of two or three varieties were brought a few years ago to Calcutta in a ship laden with ice from America. These were purchased by the Agri-Horticultural Society for their Gardens, have grown vigorously, and are now fair-sized trees. They produce blossoms abundantly every year, but nothing more.

The Pear-tree is easily propagated by layers and grafting, the latter operation should be performed in February and March, cuttings will also strike readily if put down in February and during the rains. The cultivation recommended for the Apple will suit the Pear.

In Simla and other hill stations the Pear can be brought to great perfection under cultivation. Pruning on the hills should be done in February, just before the trees burst into leaf after their winter rest. The fruit ripens about August and September.

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* Ms. Notes.

Eriobotrya Japonica.

LOQUÂT.

A small tree with handsome foliage and large noble leaves; native of Japan and China; succeeds nearly everywhere on this side of India. The fruit, borne in clusters, resembles a very small Pear. Although there are no distinct varieties specially named, there is a great difference in the fruits produced from different trees.

One sort is remarkable for its deep apricot colours, while another ripens of a light primrose colour. Others are more or less distinguished by their acidity or sweetness, or the largeness of their stones, and by the size of the fruit itself, some of which are perfectly spherical in shape.

The merit of this most delicious fruit will depend much upon the cultivation bestowed upon it. The season is usually very dry when the fruit is swelling. An abundant supply of water at that period, as well as occasional drenches of liquid manure, will be found highly beneficial. About the middle of October the roots should be laid bare, and allowed to remain so for a week, after which they should be closed in, a plentiful supply of well decayed cow-manure having been applied. A good watering to begin with will be found very beneficial. The late Captain Hollings* stated that Loquâts produced in the gardens at Lucknow weighed as much as three tolas each.

The trees come into blossom twice in the year: first, in August, when, however, they set no fruit; and again about the end of November. The flowers are borne in erect bunches, are of a dingy white colour, and emit a delightful fragrance, somewhat like that of the Hawthorn blossom. The fruit is in season from about the middle of March till the middle of April. Besides being so excellent for the dessert, a remarkably fine preserve may likewise be made from it.

Plants are usually propagated from seed, which should be sown immediately, as it is said not to keep; but to make certain of a good sort, it is best to obtain grafts from some tree, the merit of whose fruit has been already ascertained, and not to rely upon what a seedling may chance to produce. The grafting should be done in June and July.

The Loquât rarely makes a superabundant growth of wood. Pruning, therefore, is perhaps best abstained from altogether, except it be the cutting in of the small branches that have just borne fruit. Care, however, should be taken not to shorten, on the approach of the cold season, any of the young shoots of the past season's growth, as it is from the extremities of these that flowers are always produced.

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* 'Journal of the Agri.-Hort. Society,' vol. iii, p. 72.

The Loquât grows to a great size in Assam. In a garden at Gowhatti a tree I measured had a trunk as much as fifty inches in girth, and was correspondingly high. It seemed to be wholly unproductive.

ROSACEÆ.

Rubus rosæfolius.

MAURITIUS RASPBERRY.

This plant, a variety of which produces double white flowers, very like Roses, common in all gardens about Calcutta, is a native of Mauritius; whence plants bearing single flowers were introduced some little time ago. These bear fruit about the middle of February, very similar in appearance to the English Raspberry, but filled with hard seeds, and having no better flavour than that of a bad Blackberry.

Easily propagated by removal of suckers, or by seed.

Rubus albescens.

HILL OR MYSORE RASPBERRY.

A large-growing straggling kind of Bramble, remarkable for the pure white kind of down with which the young shoots are entirely covered; native of the Nilgherry Hills, where it grows wild everywhere in great abundance.

The fruit, except in bearing a hoary appearance, is very similar to the common English Blackberry, but vastly superior in flavour. Indeed there is no fruit in the country from which more delicious tarts are made.

Though rarely met with, the plant thrives well in the neighbourhood of Calcutta. It blossoms in February, and bears fruit in March; and by judicious attention to the cultivation can be rendered very productive.

The treatment it demands seems to be very similar to that bestowed upon the Raspberry in England. The shoots that have once borne become afterwards barren, and should be cut away completely out of the plant. Otherwise, if they do not actually die, as is most commonly the case, they become aged and unsightly, and draw the nutriment of the soil from the bearing canes, to which it should be entirely directed.

It requires a good rich soil, and a frequent renewal of it, or, perhaps better, a complete change of ground altogether. This is best effected by raising a fresh stock of plants by digging out suckers during the rains.

In Simla and other hill stations, where it grows wild, this Raspberry is in great demand for Jams.

Fragaria vesca.

STRAWBERRY.

The produce of the Strawberry in India is generally very poor, as to size. Occasionally some fine-flavoured handsome fruits are borne, not anything, however, like as large as are ordinarily met with in Europe. This is owing partly to indifferent cultivation, partly to climate, and largely to the character and variety of the plants themselves; but leaving the mode of cultivation out of the question, it is certain that the Strawberry is grown in some parts of India much more satisfactorily than in others. In Meerut especially, and Saharunpore, the fruit is produced most abundantly; and Captain Hollings has stated that "the Strawberries produced at Lucknow are very fine, attaining to the weight of nearly a tolah each."* The neighbourhood of Calcutta, on the other hand, appears far from favourable to the growth of this delicious fruit.

The Alpine Strawberry I have raised from seed, and cultivated in my garden at Chinsurah. I found it exceedingly vigorous in growth, and much more productive than the other kinds, to which, however, it is unquestionably very inferior. It is a long sugar-loaf-formed fruit.

The time for planting out young Strawberry-plants is about the beginning of October. I have put them out a month earlier than this, but without advancing the growth of the plants in the slightest degree. The finest fruit in England is obtained from plants of two years old. But in this country it seems all but universally agreed that young plants only of the current year's growth can be employed with success.

Having chosen a piece of ground fully exposed to the sun, dig rows of holes in it eight inches in diameter and six inches deep, the holes a foot apart, and the rows also a foot asunder. Between each third row make a small raised path ten inches wide to give access to the plants. Fill the holes with a mixture of equal parts of old cow-manure, leaf mould, and common soil, and in each put down a Strawberry-plant. Water the plants at the time, and as often afterwards as they seem to require it. When they have become well established, they will perhaps begin to send out runners. These it would be well to remove,

* 'Journal of the Agri-Hort. Society,' vol. iii, p. 72.

though some persons are of opinion that the doing so causes a larger development of leaves than is favourable to the productiveness of the plants. By February they will have become good large plants, and may be expected then to be in full blossom. But at this period, in the vicinity of Calcutta at least, the cultivator often meets with considerable disappointment. Sometimes the plants will expend themselves only in leaves, and produce no flowers, or will exhaust themselves in putting forth flowers in unbounded profusion, and not set a single fruit.

On first observing the flowers die off without being productive, I imagined they must be such as contained only stamens, or male organs, as it is well known often happens in Europe, and indeed always so with the Hautbois, which bears the male and female organs on distinct plants. But on examination I found the flowers to contain both sexual organs. Such plants as bore fruit I noticed did so invariably only on footstalks which supported but one single flower. But to what to attribute the general barrenness of the plants, that so often occurs, I have altogether failed in ascertaining. In England, however, it is believed that a fall of rain when the plants are in bloom is essential to the setting of the fruit. This rarely happens in India. Perhaps a watering overhead with the watering-can might conduce to the same result.

The Strawberry requires daily watering during the time of its growth and bearing. And afterwards likewise during the dry season it suffers severely, and is almost sure to perish if not frequently watered. On the other hand it is not at all injured by the rains, particularly if planted on ground somewhat raised, so as to escape being flooded. The fruit requires to be covered with a net, or protected in some other way when ripening, else it is sure to be devoured by birds. It is propagated by 'suckers.'

On the hills it is cultivated with much success, the method employed being the same as for the plains, only that the plants are planted out in February instead of October.

RHAMNACEÆ.

Zizyphus vulgaris.

LONG PLUM—ROUND PLUM.

Paivandee Bâer—Kool-Phul.

A small thorny tree; native of Syria and the Levant: common about Calcutta and in most parts of Upper India. Comes into blossom towards the end of September, bearing small greenish-white flowers, and ripens its fruit towards the end of January.

The fruit has a thin, pale-green, smooth rind like that of an Apple, and bears a stone in the centre. Between the stone and the rind is a pleasant, crisp, refreshing substance like that of a juicy Apple, but with no very marked flavour. Dr. Hogg, in his report on the Paris International Exhibition of 1867, states: "This is sold in Covent Garden Market under the name of Japonicas, with what reason it is impossible to tell. It is from this fruit that the confection call *Jujubes* receives its name, and which should consist of gum Arabic and sugar dissolved in the decoction of this fruit and then evaporated to its proper consistence; but as made in England, the fruit forms no part of the ingredient."

There are two varieties; one of the form and size of a Swan's-egg Plum, the other of the same size, but round. The tree that bears the oval fruit has oval leaves, and the one that bears the round fruit round ones. The tree is of the most rapid growth; immediately after it has produced its crop of fruit, it is the custom of the mâlees to prune it severely, and to cut in branches even that are nearly as thick as a man's wrist.

Plants cannot be raised true from seed, but require to be propagated by grafting. "Trees," says General Jenkins, "may be grafted in several ways, but the usual process in Bengal is by ingrafting a ring of bark about one inch long on stocks of the common Bâer. The ring is to have one eye, and to be soaked some time in water, after being drawn off, and then placed upon the stock intended, and from which the bark has been cut off in size equal to the ring to be fitted on. Protect from the weather, and cut away all other branches from the common Bâer."*

Not cultivated on the hills.

Zizyphus Jujuba.

Bâer—~~Narikeles~~ Kool.

A small, very thorny tree; native of India; blossoms in the rains and ripens its fruit at the beginning of the cold season.

The fruit, which is usually borne upon the tree in unbounded profusion, is perfectly round, of the size of a very large Cherry, smooth, shining, and of a tawny yellow colour; rather acid in flavour, and not altogether unlike a Siberian Crab-Apple. It affords a very nice dish cooked with sugar.

The tree of this likewise is of extraordinarily rapid growth; cut down to the ground after fruiting it will spring up again to the height

* MS.

of fifteen feet, and be covered with an amazing crop of fruit the following season.

Propagated from seed, and requires no care bestowed on its cultivation.

Not cultivated on the hills.

Hovenia dulcis.

A large tree; native of China, Japan, and the hills of Northern India.

Don and Dr. Lindley state that the peduncles of the fruit become extremely enlarged and succulent, subcylindrical, smooth, and an inch long; contain a sweet red pulp, having in flavour much the resemblance of a ripe Pear, and are in much esteem in China.

The tree has been a great many years in the Calcutta Botanical Gardens; but never, that I can learn, has produced anything there fit to be eaten in the way of fruit. Propagated by seed and cuttings.

Not cultivated in gardens on the hills, although common enough as a jungle tree.

SAPOTACEÆ.

Chrysophyllum Cainitum.

STAR-APPLE.

This tree, which is a native of the West Indies, is described as bearing "Flowers which grow in small purplish bunches, succeeded by a round, fleshy, smooth fruit, resembling a large Apple. In the inside it is divided into ten cells, each containing a black, shining, rhomboidal seed, and surrounded by a white or sometimes purplish gelatinous pulp, of a very sweet, agreeable flavour. When cut across, the seeds, which are regularly disposed round in the axis of the fruit, present a stellate figure, from whence the name of Star-apple is derived."*

This is evidently not the tree which exists in the Government Botanic Garden under the above name, and which bears small yellowish white flowers, and about the middle of February a fruit of the size, colour, and form of a Damson or ripe Kurônda, of a shining purplish-black colour, with a stone in the centre. It has a juicy insipid sweetness when fresh gathered from the tree; but when dried a short time in the sun, it has a very agreeable flavour, much resembling that of

* 'Penny Cyclopædia.'

dried Cherries. This seems to correspond in every respect with the species called Chrysophyllum oliviforme, "The Damson Star-apple."

Dr. Geo. King, writing in 1888 of the C. Cainitum, says that the plants in the Calcutta Botanical Gardens, "produce a large quantity of fruits every year."

These trees are cultivated much for the beauty of their leaves, which have on their lower sides (as the name of the plant denotes) a bright golden metallic lustre. Propagated by seed and cuttings.

Not cultivated on the hills.

Lucuma mammosa.

MAMMEE-SAPOTA—AMERICAN MARMALADE.

Don says of this tree that it is a "Native of South America; bears a large oval or top-shaped fruit, covered with a brownish, rough skin, under which is a soft pulp of a russet colour, very luscious, which is called natural marmalade, from its likeness to marmalade of Quinces. It is cultivated much in the West Indies and South America for its fruit."

Dr. Voigt states that it was introduced from China into the Calcutta Botanical Gardens in 1807, but had not flowered up to 1814. It is not in existence there now, as the reviser of the present edition has ascertained from Dr. King.

Achras sapota.

SAPOTA—SAPODILLA—BULLY-TREE.

NASEBERRY OR NEESBERRY.

A tree of moderate size; native of Jamaica; with foliage of so ornamental a character as to render it on that account alone a desirable object for the garden.

The fruit is of the size and form of a small Orange, with a rough, brown, bark-looking, but thin and tender rind. The interior containing black almond-formed seeds, consists of a pale-brown juicy pulp. A more luscious, cool, and agreeable fruit is not to be met with in this or perhaps any country in the world.

The tree bears two crops in the year: one during August, of not much value; and one in all February and March. Two varieties of the fruit are mentioned, distinguished by the one being round, and called Zapotilla, and the other by being of the form of an egg. In

point of flavour or merit I have discovered no difference whatever between these so-called two varieties. The fruit, though common enough in the neighbourhood of Calcutta, does not seem to be much known in other parts of the country. The tree blossoms in bunches of small dingy flowers.

Plants are propagated by grafting upon seedlings of the Mimusops Kauki for stocks. Young plants are likewise easily raised from seed; but these take a long time to come into bearing, nor are they considered suitable for grafting upon.

Not grown on the hills.

Mimusops Kauki.

Khirnee.

This is a large forest tree, found in most parts of India. The fruit, which is borne in the hot season, is about the size and shape of a small grape, bright yellow, and very sweet; but with a milky juice. The tree does not possess any merit to claim for it admittance into the garden, except perhaps for its foliage, which is very handsome, resembling somewhat that of the Camellia, but of a pale olive-green. Propagated by seed sown during the rains.

Not cultivated on the hills.

EBENACEÆ.

Diospyros kaki.

DATE-PLUM.

Bilâetee Gâb.

A large tree, native of China, with large-leaved handsome foliage; unsuited for gardens except of great extent; thrives well, and bears abundantly in the neighbourhood of Calcutta.

The fruit ripens during the month of August, and is about the size of a large Apple, with twin almond-like stones in the centre. The rind is of a rich ruddy crimson colour, in texture somewhat resembling, but rather rougher than, that of the Peach. It has rather a disagreeable odour. In flavour it is suggestive of an over-ripe and very mellow Apple, of which the flesh possesses something of the same consistency, with a little of the taste of a Melon. Though not unpalatable, it is a fruit which few perhaps would care to partake

much of. A fine preserve is said to be made from it by the Chinese, for which, indeed, it seems well adapted.

Easily propagated by sowing the stones in August.

Not cultivated on the hills.

APOCYNACEÆ.

Carissa carandas.

Kurônda.

A small shrub, with dark shining leaves, and most formidable thorns; native of India, and common in all parts of the country. Don describes it as a tree of fifteen to twenty feet high; but I have never met with it more than at most six or ten feet high. It is in blossom in February, and the fruit is in season in August and September. A milky juice exudes from the wounded part of the fruit when gathered, which is very adhesive and difficult to remove if allowed to fall upon the hands.

The fruit, when ripe, in shape, size, and colour bears a strong resemblance to a Damson; but bears within it a number of small seeds. It is of great value for making preserves of. In its unripe state, moreover, it may be used from about the middle of May to the middle of July for tarts and puddings, for which purpose no fruit of the country is preferable. It has, when cooked, much of the flavour of the green Gooseberry. The trifling toughness of its skin is the principal objection to it. The tree is largely used for hedges.

Plants are propagated from seed sown during the rains.

Not grown on the hills.

Arduina bispinosa.

NATAL PLUM.

A small thorny shrub, native of Natal; bears a strong resemblance to the Kurônda, to which, indeed, it is so closely allied as in general aspect to appear but a superior variety of that plant; very handsome when in full blossom with its bright, sparkling, white flowers, and, as may be seen at the Cape, with its dark, rich fruit ripening upon it at the same time.

The fruit is of the form and size of a small Egg-plum, and when ripe of a deep purple colour like a Damson or Kurônda. The gardener at

the public gardens at Cape Town told me it was in great request there for cooking purposes, and was held in high esteem.

I raised plants from seed I brought with me from the Cape; but during the six years they were in my garden they were never productive. It has existed many years in the Calcutta Botanical Gardens; but I learnt that it has never produced more than a solitary fruit or two there. I was told by Mr. M'Ivor that it thrives well and bears fruit abundantly at Kulhuttee on the Nilgherries.

Grafted upon the Kurônda, it is rendered productive.

Not cultivated at the Himalayan hill stations.

OLEACEÆ.

Olea Europæa.

OLIVE.

The Olive-tree is a native of the south of Europe, and though introduced into this country a great many years ago, has never, as far as the bearing of fruit is concerned, been cultivated with success. The tree seems to thrive tolerably well, but is unproductive. Dr. Voigt says that it "was introduced into the Calcutta Botanical Gardens in 1800, but had not flowered up to 1814;" and Dr. Graham states that "the climate seems to suit it, and it may possibly hereafter become of some importance." Trees, however, exist in the Calcutta Botanical Gardens still, but up to the present time have never borne.

The cultivation of the Olive has been attempted of late to some extent in the Punjab, but not seemingly with the prospect of any success. A very hot climate, M. Du Breuil states, is as prejudicial to it as a cold one, and that though it has been seen to attain to an immense size at Cayenne and St. Domingo, it has never fruited in those parts.

It is unsuited for the hills, where, however, plants are to be found in glazed structures.

SOLANACEÆ.

Physalis Peruviana.

PERUVIAN CHERRY—CAPE GOOSEBERRY.

Tipâree.

A herbaceous perennial, native of Peru; naturalised at the Cape, and in this country.

The fruit, which exactly resembles that of the Winter-cherry of the English gardens, to which indeed it is closely allied, is concealed in a

dry leafy appendage, is of a bright amber colour, of the precise size and form of a Cherry, and as delicious and serviceable as any the country produces. No fruit in the world perhaps affords a more excellent preserve.

Seeds should be sown in May or June, and the seedlings planted out in the open ground in rows four feet apart, and at the distance of two feet from each other. They will thrive in common garden soil, but better in that which has been somewhat enriched with manure. When about eight inches high the plants should be earthed up to half their height. When they come into blossom it will be of advantage to nip off the ends of the shoots, as this will conduce towards keeping them less straggling, as well as towards throwing greater nourishment into the fruit. The fruit ripens in all January and February. Though perennial, in cultivation the plants must be treated as annuals; and the old ones, after they have once borne, be rooted up and thrown away; and in the proper season sowings be made for a fresh supply.

The plant is of a tender nature, and will not endure much cold. I endeavoured to cultivate it several seasons at Ferozepore, but without success. It throve vigorously all the hot season, but the cold destroyed the large crop of fruit before it could ripen.

Not suited for the hills.

MYRTACEÆ.

Punica Granatum.

POMEGRANATE.

Anâr.

This plant has been placed here under Myrtaceæ to avoid confusion: but Hooker and Bentham place it under Lythraceæ. It is common in all parts of India, but never produces fruit at all to be compared with that brought down annually by the Afghan traders from Cabul.

There are two kinds met with in the neighbourhood of Calcutta; the *Dêsee*, or country kind, a hard, dry, valueless fruit, and the so-called "Patna" kind, of much larger size, and in high estimation among the natives.

Captain Burton describes three which he met with in Arabia:—

"The best is *Shâmi* (Syrian): it is red outside, and very sweet. I never saw in the East, except at Meccah, a finer fruit than the Shâmi; almost stoneless, like those of Muscat, they are deliciously perfumed, and as large as an infant's head.

"2. The *Turki* is large and of a white colour.

"3. The *Misri* has a greenish rind, and a somewhat sub-acid and harsh flavour." *

Sir A. Burnes also mentions a "famous Pomegranate without seeds grown in gardens under the Snowy Hills near the Cabul river."

The finest varieties of this fruit, however, seem to have been quite unknown in India till very recently † Mr. W. H. Bartlett sent to the Agri-Horticultural Society seed of fruits he had raised "from Cabul stock," in his garden at Buxar. One of these fruits he states was of the size of "an ordinary human head;" and one of "a small Shaddock." He manured and constantly well watered the tree, he adds, till it showed signs of flowering, and afterwards while the fruit was ripening.

The Pomegranate will always maintain its place in an Indian garden if it be only for the splendour of its brilliant scarlet blossoms, which no flower can surpass, and which it produces more or less during all the hot season and rains. It bears its fruit principally during the cold season, which, if not protected in due time, is almost sure of being destroyed. An insect, which I have detected to be a certain hairy caterpillar, penetrates the hard rind when the fruit is a little more than a quarter grown, and by devouring part of the interior, causes the remaining part to canker and rot. To obviate this, the fruit, when as yet small, should have the large fleshy calyx by which it is surmounted cut cleanly off, and then be tied up loosely in a piece of linen cloth.

The native mâlees recommend a large proportion of soorkee (bricks broken fine), together with old decayed cow-dung, to be mixed with the soil in which the Pomegranate is grown. It is not, however, particular as to soil. It succeeds even in the driest, but it does not thrive in one that is surcharged with wet. To yield fine fruit it must be manured each year. This is best done perhaps in December. The Pomegranate sends up a great deal of young wood from its base, which should from time to time be cut clean out, as it not only chokes up the plant, but tends to withdraw the nutriment which should go to the fruit-bearing stems. The fruit is produced from the extremities of the young branches formed the same year, which after bearing it is well to cut closely in.

Plants may be multiplied either by seed, by cuttings, or by layers, put down in February. The best plan is to raise seedlings, and to graft upon them, when of sufficient height, from trees of a superior kind.

It is not successfully cultivated on the hills.

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* 'Pilgrimage to El Medina and Meccah,' vol. i, p. 388.

† Feb. 5, 1874.

Psidium Guajava.

GUAVA.

Pyâra—Unjeer.

Umroot—Sufree-Âm.

The Guava-tree is said to be a native of South America, whence originally it was introduced into this country. It is, however, so thoroughly naturalised in all parts of India as to lead one to suppose it must be indigenous to this country, a conclusion Dr. Wight seems to have come to, as he has included it in his Prodromus.

It is a vigorous, stout-growing shrub, rising sometimes to become a small tree of fifteen feet high or more. It commences to blossom during the hot season, and continues to do so as well as to bear fruit during the rains, up to the end of the cold season. The finest fruit, however, is to be met with when the general season of bearing is over. About the end of January fruits of extraordinary size and beauty are usually exhibited at the Calcutta Horticultural Shows. The finest fruits are cultivated in Allahabad and its districts.

To preserve the fruit on ripening from being devoured by birds, bats, and squirrels, each one at an early stage must first have the calyx on its summit cut clean off, and then be tied up loosely in a piece of fine cloth.

Young plants are easily raised from seed during the rains; but to make sure of a good kind, propagation by layers is usually resorted to. Rooted suckers, also, may be occasionally taken from the base of the main stem. It requires no particular cultivation, and thrives in any soil.

PEAR GUAVA.

Of this there are two varieties.

1. The fruit of the best cultivated kind is of the size and form of a Lemon, with a perfectly smooth exterior, of a pale straw colour outside and white within; soft as butter, with a very strong perfume. This is borne one only upon the footstalk.

2. *Câffree* is the native name of a variety very distinct in appearance from the previous one. It is a large irregular-formed fruit, warted and furrowed not unlike a Citron. Of the two kinds this is considered somewhat the inferior, though the difference perhaps is trifling. Of this variety I have observed as many as three borne on the footstalk.

APPLE, OR RED GUAVA.

The shrub that bears this variety is somewhat smaller, with smaller and darker leaves, and is distinguished also by bearing more than one flower on the footstalk. The fruit, which is red inside, is of a fuller and more strawberry-like flavour, but has generally the fault of being densely filled with seeds.

Why the one variety should be denoted as the Pear and the other as the Apple it is difficult to tell; for in external appearance they are commonly so decidedly similar that, until cut open, it is impossible to distinguish the one from the other.

Psidium Cattleianum.

PURPLE-FRUITED GUAVA.

Don describes this species of Guava as "a tree of from ten to twenty feet in height; a native of China." Sir J. Paxton makes it synonymous with P. Chinense; but whether a distinct variety, does not appear. It has been described as a fine foliaged plant, whose thick, leathery, perfectly smooth obovate leaves somewhat resemble those of Camellia Japonica. Sir J. Paxton says of it:—

"Not many plants have a greater claim on our attention. Its dark, shining foliage and pendulous branches make it a great ornament. . . . It is, perhaps, the most perfect and graceful evergreen that an amateur of plants ought to desire, or even can possess." *

The fruit, according to the description given of it, is of the size and form of a large Plum, of a deep claret colour.

Mr. Tillery says, "He has six or seven varieties of Guava; but all are worthless compared with Cattley's."

There seems a doubt whether this species, by all accounts so desirable, has ever been introduced into this country. Dr. Voigt enumerates it among the plants still wanting up to the year 1841. A solitary small tree exists in the Calcutta Botanical Gardens, which the malees point out as having had the name assigned it by Dr. Wallich, but is far from answering to the description of the plant given by Don and others. It has never yet yielded fruit. Another small plant, likewise of recent introduction, has been shown me there, which corresponds more nearly with the ordinary descriptions; but as it has not fruited or flowered, the matter is still uncertain. I notice, however, the Psidium Cattleianum is comprised in the List of Plants in the Calcutta Botanical

* 'Magazine of Botany,' vol. i., p. 118.

Gardens recently given by Dr. Anderson. Dr. George King states (in 1888), that the plants in the Botanical Gardens "do not produce fruit, but have been known to flower."

Psidium pumilum.

A moderate-sized shrub, native of India; at once recognisable by the smallness of its leaves, resembling somewhat those of a Myrtle. It bears in the rains, and its fruit, which is small and of the shape of a crab apple, has a fine myrtle flavour and is very sweet, but full of seeds, by which it is freely raised, if sown during the rains.

Psidium Guiniense.

GUINEA GUAVA.

A shrub of the height of eight to twelve feet; native of Guinea; said by Don to bear a "berry fulvous, rather pubescent, red inside, about the size of a Nutmeg, and of an exquisite taste."

There have been plants for a great many years past in the Calcutta Botanical Gardens, where, as Dr. Voigt states, they bore fruit in the rain season. They are, however, not known to bear fruit there now.

Psidium polycarpon.

MANY-FRUITED GUAVA.

A moderate-sized shrub, said to be a native of Trinidad, and described by Don as bearing a fruit of delicious taste. The fruit produced by the plant to which the name is assigned in the Gardens of the Agri-Horticultural Society is a poor, turpentine-flavoured berry, quite worthless; pale yellow, pear-shaped, and of the size of a Plum. The plant blossoms at the end of March, and ripens its fruit at the beginning of July.

Propagated by seed sown in July and August.

Psidium sp.

STRAWBERRY GUAVA.

This species, the name of which I have been unable to ascertain, is met with in the Gardens of the Agri-Horticultural Society, as well as

in some few others in the neighbourhood of Calcutta. It is a small, low shrub, with large, dark, pendulous, shining leaves, and ripens its crop about the end of September, after which it blossoms almost immediately again, and ripens fruit a second time in December.

The fruit is of the size of a Nutmeg, pale yellow, contains a soft pulp, and possesses in a high degree the delicious fragrance and flavour of the Strawberry. It has, however, the great fault of being densely full of small hard seeds.

Propagated easily by seed sown in February.

None of the foregoing can be cultivated on the hills.

Myrtus tomentosa.

HILL GUAVA—HILL GOOSEBERRY.

This is a remarkably handsome shrub, with fine dark foliage, bearing numerous pretty pink blossoms which resemble somewhat those of the Peach.

From the fruit, which is a berry of a pale, dirty-yellow colour, a jelly is made, in flavour a little like Apple-jelly.

The plant is found in abundance amongst the jungul of the Nilgherries. It has been introduced into the plains, where, however, it does not thrive. Under cultivation on the hills, this fruit is not to be despised.

Syzygium Jambolanum.

Jâmun.

A large timber-tree with fine verdant foliage, very common in all parts of India; blossoms at the beginning of the hot season, and bears, about the beginning of the rains, a juicy kind of fruit, with a stone in the centre, much resembling a Damson in appearance, with a flavour peculiarly its own. There are three varieties; the best, a somewhat larger fruit than the others, is found in the N.-W. Provinces, and is not at all a fruit to be despised.

Propagated by sowing the stone during the rains.

Not suited for the hills.

Eugenia Michelii.

BRAZIL CHERRY—CHERRY OF CAYENNE.

A large, handsome, bushy shrub, native of Brazil, bears small, pale-green uninteresting flowers. Two or three large, thriving plants are

to be met with in the Calcutta Botanical Gardens which ripen their fruit in May.

Not suited for the hills

The fruit is about the size of a button, round and ribbed, and is considered agreeable by the natives.

It blossoms again in June, but does not yield a second crop of fruit.

Fine large plants have been growing likewise for many years in the gardens of the Agri-Horticultural Society, but they have hitherto been unproductive. Propagated by seed and by layering.

Not suited for the hills.

Eugenia Jambos. (Jambosa vulgaris.)

ROSE-APPLE—JAMROSADE.

Goolâb Jâm.

A tree of rather handsome growth, with verdant oleander-formed leaves, a native of India, where Dr. Voigt states it belongs to both peninsulas. Dr. Riddel says that in the Madras Presidency "he has only met with the fruit at Hyderabad, and that he has made every attempt to introduce it elsewhere without success." It blossoms with large greenish-white flowers in February, and bears fruit in the rains and during the cold season. The fruit is exceedingly handsome, being of the size and somewhat of the form of a small Apple, of a fine opaque Apricot colour with a beautiful blush of red upon it, and with a fine delicate rosewater perfume. It is, however, cultivated more for ornament than for use, as it can hardly be considered eatable, being of a poor flavour and of a dry, pithy consistency.

Plants are propagated by seeds or by layers during the rains.

Not suited for the hills.

Eugenia (Jambosa) Malaccensis.

MALAY APPLE—OTAHEITE CASHEW.

Malaka Umrool.

A remarkably handsome tree, with fine large, laurel-formed, verdant, deep-green foliage; native of Moluccas. It blossoms in the hot season with large, beautiful crimson flowers, and towards the end of the rains and during the cold season ripens its fruit. The fruit is of the size

and form of a very small Apple, perfectly smooth, of a pure translucent white with a beautiful blush of crimson. Some persons eat it, but it is not worth eating.

Plants may be propagated by seed or by layers during the rains.

Not suited for the hills.

Eugenia (Jambosa) alba.

Jumrool.

A moderate-sized tree, with large, dark, handsome foliage, native of the Islands of the Indian Archipelago, very ornamental when covered with its crop of fruit in the rain season.

The fruit is of the size of a small Apple, pure white, shining, and wax-like, has a raw, watery, insipid taste, and is hardly fit to be eaten.

Propagated from seed during the rains.

Not suited for the hills.

Eugenia (Jambosa) aquea.

Lâl Jumrool.

A tree of considerable size, native of India, with foliage of large, noble, lanceolate leaves; blossoms in March, and bears fruit in May and June, when, as Roxburgh truly says, it is "conspicuously beautiful, with the drooping branches of the full-grown, brilliant-coloured fruit appearing through the dark deep-green leaves."

The fruit is of the size of a small Apple, of a waxy appearance, and has a somewhat aromatic taste, but is hardly eatable. There are two varieties, the one perfectly white, and the other of a beautiful lively pale rose colour.

Propagated from seed during the rains.

Not suited for the hills.

CINCHONACEÆ.

Vangueria edulis.

VOA VANGA.

A small tree, covered with formidable thorns; native of Madagascar; produces what is said to be a good dessert fruit, eaten by the

natives of Madagascar and the Mauritius. Plants were in existence in the Calcutta Botanical Gardens for a great many years, but none are to be found there now. Of the merits of the fruit I cannot speak from personal knowledge, not having tasted it. It has a rather large stone in its centre, by the sowing of which the tree may be propagated.

EDIBLE NUTS.

PALMACEÆ.

Cocos nucifera.

COCOA-NUT.

Narial—Khopra.

BESIDES the ordinary kind of Cocoa-nut tree met with so commonly in Lower Bengal, there are several distinct varieties, of which may be mentioned in particular :—

1. The King Cocoa-nut tree. This Mr. Robinson describes as "very handsome, of a golden orange-colour, and as never attaining to more than fifteen or twenty feet high." This is a choice kind, native of Ceylon, where, Mr. Robinson observes, it is "not easily procured, being confined to the gardens of the higher Cingalese and a few European gentlemen."

2. The Dwarf Cocoa-nut. This, Mr. Robinson states, "attains to about fifteen feet, and is much sought after in Ceylon gardens." *

3. The Brahmin Cocoa-nut produces large handsome nuts of a clear deep golden colour, principally esteemed for the milk they contain, but considered inferior as regards the quality of the kernel.

M. Le Goux de Flaix states, "There are three kinds cultivated in Hindostan, and four more in the isles of the seas adjacent to this country;" and describes them as follows :—

"1st. The Cocoa-nut of the coast of Coromandel exhibits a husk very smooth and shining, of a reddish-yellow colour, on which account it is called by the Hindoos 'The Brahmin Cocoa-nut.' The sutures opposite to the side on which the eye is placed are more swelled towards the base, a part which is also more flattened than that opposite to it, even when enveloped in its husk.

"2nd. The Cocoa-nut of Canara. This species has for its distinguishing characters a form perfectly oval, a ligneous and more solid

* 'Agri-Hort. Society's Journal,' vol. iii, p. 162.

shell, a husk exceedingly green, and filaments remarkably hard; all its sutures so little prominent that they are sensible to the eye, but not to the touch.

"3rd. That of the Coast of Malabar, which is turbinated: that is to say, larger at the hole which is found under the covering that binds and fixes the pedicle of the fruit to its cluster.

"4th. The Cocoanut of the Maldives, sandy islands, is very small, and absolutely spherical; its sutures are very much raised, and far more prominent in the upper part than those opposite to its pedicle.

"5th. That of Achem, a small island situated on the south side of those of Sonda and the Moluccas, is distinguished by its ovoid form, its extreme smallness, and the thickness of its kernel, which is so pulpy that there is scarcely any vacuity in it, and that it contains very little liquor.

"6th. The species cultivated in the Nicobar Isles, situated in the upper part of the Bay of Bengal, which is the largest of all the varieties of this fruit. Its external form is triangular; its husk is remarkably thick; the nut is oval, and a little flattened at its two poles, and there issues from the upper pole a sharp point,—on which account it is called the *Needle Cocoanut.*

"7th. The Cocoanut of Ceylon is a very elongated spheroid; it has it suture corresponding to the orifice or eye of the germ, more prominent by a strong line than those of the other countries."

He likewise mentions: "About the eighteenth or nineteenth day after a Cocoanut is sown, the point of the germ is observed issuing from the earth like the small tooth of an elephant, and as white and smooth. This point retains this form for a fortnight or three weeks. It is then exceedingly tender, saccharine, of an agreeable taste, and exceedingly delicate to eat either raw or roasted in ashes. It is often presented at the best tables of the Europeans."*

Sir E. Tennent thus describes the culture of the Cocoanut in Ceylon:—

"The farther the Cocoanut Palm is removed from the shore and the influences of the sea, the more the growth is diminished and the less abundant its fruit. . . . . The Palms require constant irrigation during the earlier stages of their growth.

"The ripe nuts are put down in April, and covered an inch deep with sand and sea-weed, or soft mud from the beach, and watered daily till they germinate. In September they are set in holes three feet deep and twenty to thirty feet apart. Before putting in the young plants, it is customary to bed the roots with soft mud and sea-weed,

* 'Tilloch's Philosophical Magazine,' vol. xx, p. 316, translated from the 'Bibliothèque Physico-Economique,' Nos. 5, 6, 7, &c., 1804.

and for the first two years they must be watered and protected from the glare of the sun by shades made of the plaited fronds of the Cocoanut Palm or leaves of the Palmyra. After the second year irrigation becomes unnecessary. Each alternate year the young Palms are dressed with sea-weed and salt manure. Towards the end of the fifth year, though sometimes not till the seventh, the flower-stalk may be expected to appear. Each nut requires a year to ripen." *

The natives consider it a point of great importance in the cultivation of the Cocoanut in Bengal, that in the month of September the lower fronds of the Palms should be well pruned away. They say that otherwise the trees are not nearly so productive.

It is perhaps needless to add that the Cocoanut Palm cannot be cultivated for its nut on the hills; but as an ornamental Palm in a dwarf state, in a pot, it forms a handsome appendage to the stove.

TAXACEÆ.

Salisburia adiantifolia.

GINGKO—PAK-O.

A tree of immense size, remarkable for its peculiar foliage, the leaves being of the size of a man's hand, and resembling in form those of the Maiden-hair Fern, whence it derives its name, or more nearly perhaps those of Caryota urens. Humboldt says, "the original native country is unknown to us."† It was introduced into the Calcutta Gardens many years ago from China, and again very recently by Mr. Fortune. But it makes no growth whatever here, remaining year after year of much about the same size as when first brought. I saw it growing in the Public Gardens at Ootacamund on the Nilgherries; but no better success, I understand, has attended its introduction there. The fruits, it is said, are roasted and eaten in China as Chestnuts are in England.

ARTOCARPACEÆ.

Brosimum alicastrum.

JAMAICA BREAD-NUT TREE.

Dr. Voigt, quoting Swartz, says that the roasted nuts of this tree are used instead of bread, and have much the taste of Hazel-nuts. The

* Sir E. Tennent's 'Ceylon,' vol. ii, p. 529.
† 'Aspects of Nature,' vol. ii, p. 114.

tree was introduced, he says, in 1804, into the Calcutta Botanical Gardens, but had not flowered up to 1814.

In reply to an enquiry made in 1888, Dr. George King says: "Of this I have not been able to find any plant in the garden," *viz.*, the Calcutta Botanical Garden.

Artocarpus incisa.

BREAD-NUT.

The seeds of the Bread-Fruit, it is stated, when roasted are as good as the best Chestnuts. They are about the size of large Peas.

Artocarpus integrifolius.

JACK-FRUIT NUT.

Kuntul.

Roxburgh says that the seeds of the Jack-Fruit, when roasted, are not inferior to the best Chestnuts. Those which I have roasted and eaten have had certainly the mealiness and consistency of roasted Chestnuts, but so far from having the fine flavour of the Spanish Nut, had not, so far as I could discern, any flavour at all, and were perfectly insipid. They are about the size and form of a large Broad Bean.

The natives use them in their curries, as well as eat them cooked in ghee.

EUPHORBIACEÆ.

Aleurites triloba.

LUMBANG NUT—INDIAN WALNUT—BENCOOLEN NUT.

CANDLE NUT OF THE SOUTH SEA ISLANDS.

Desi Akrôt.

A tree of moderate size, with large round lobed leaves; native of India; produces a very inferior description of nut, possessing somewhat of the flavour of the Walnut, but of a dense pithy consistency like that of a roasted Chestnut. The nut is of a roundish form, of the

size of a Walnut, and is contained in a green husk, exactly resembling that of the Walnut. It breaks out into blossom in March with large bunches of small delicate white flowers, and ripens its crop towards the end of July, at which time it comes into full blossom again, but without yielding a second crop.

Propagated by sowing the nuts during the rains.

CORYLACEÆ.

Corylus avellana.

FILBERT.

Neither the Filbert nor any variety of Hazel-nut is to be met with on the plains of India. Numerous attempts have been made to raise plants by sowing the kernels, but have invariably proved unsuccessful. Even if plants could be raised, in all probability they would never be productive, as has been found to be the case in the Mauritius. But on the hills the tree is common enough.

Castanea Chinensis.

CHINESE CHESTNUT.

This tree, Dr. Voigt states, was introduced from China into the Calcutta Botanical Gardens in 1807, but had not flowered up to 1814. In the year 1854 a hundred seedlings were introduced into the Gardens of the Agri-Horticultural Society by Mr. Fortune, who said that the tree produced a nut quite equal, if not superior, to the Spanish Chestnut. The climate of Calcutta seems, however, little suited to them, as they have made no growth, and still continue in an unthriving state. Perhaps the tree could be cultivated to perfection on the Nilgherries.

Castanea vesca.

SPANISH CHESTNUT.

This tree will not thrive on the plains of India; but it is very common on the hills of Northern India, *e.g.*, Simla, Mussoorie, Murree, &c., where it flowers in March and April with its panicles of lavender coloured blossoms, and sets an abundance of fruit in May and June.

JUGLANDACEÆ.

Juglans regia.

WALNUT.

The Walnut-tree is common on the hills of Northern India, and produces there its crops abundantly. It is not found on the Nilgherries; neither is any productive tree, that I am aware of, to be met with in the plains. Plants are, however, easily raised from seed; but these, both in the vicinity of Calcutta and in other parts of India, after reaching to a height of about two or three feet, make no further growth, and remain the same for some years, until they ultimately die off.

STERCULIACEÆ.

Southwellia balanghas.

CHINA CHESTNUT.

This tree is a native of India, and produces seeds which Dr. Roxburgh states, when roasted are nearly as palatable as Chestnuts. In Dr. Roxburgh's time trees of large size were in existence in the Calcutta Botanical Gardens, but these have been removed, and only small plants are now to be met with there.

Propagated by seed sown in October.

NELUMBIACEÆ.

Nelumbium speciosum.

LOTUS—SACRED OR EGYPTIAN BEAN.

Kunwul.

This beautiful Water-Lily is a common plant in the tanks of Bengal, as well as in other parts of India. It displays its handsome Pæony-like flowers during the hot and rain seasons, and at the beginning of the cold season ripens its seeds in curious, drooping, cone-shaped capsules.

Sir E. Tennent says:—

"In China and some parts of India the black seeds of these plants, which are not unlike little acorns in shape, are served at table in place of Almonds, which they are said to resemble, but with a superior delicacy of flavour. I tasted the seeds in Ceylon and found them delicately flavoured, not unlike the kernel of the

Pine cone of the Apennines. This has clearly no identity with the fruit which Herodotus describes as the food of Lotophagi of Egypt."*

On this point Dr. Lindley states :—"The Lote-Bush, which gave its name to the ancient Lotophagi, is to this day collected for food by the Arabs of Barbary. It is the Zizyphus Lotus of the botanists."†

In their unripe state the nuts of the Sacred Bean are eaten raw, when to me they seem to have much of the flavour and crispness of Filberts. On ripening they become hard, and are then roasted before eaten.

ANACARDIACEÆ.

Pistacia vera.

PISTACHIO NUT.

Pista Badâm.

The well-known nut of this tree which, when fried in butter, forms so delicious an addition to the dessert, is obtainable in great abundance in the cold weather in the bazars of most parts of India. It is not, however, the produce of this country. The tree is a native of Syria. Dr. Voigt states that it has been introduced into the Calcutta Botanical Gardens, but is unaware whether it has ever flowered there. It is not to be met with there now, nor has been, as far as I can learn, for many years past.

Dr. Riddel states that the nuts are brought from Bussorah in great abundance. The Afghan traders, who bring them about for sale, state that they obtain them from Bâlk, and that they are not produced in Cabul. Dr. Lindsey Stewart, however, in his 'Notes of a Tour,' mentions having found a good many Pistacia in the Punjab Salt Range.

Anacardium occidentale.

CASHEW NUT.

Hijlee Badâm—Kâjoo.

The Cashew nut-tree is a native of this country, as well as of the West Indies. In height and general appearance it is very like the Walnut tree, but with oval, blunt, alternate leaves. The fragrant, rose-coloured flowers are borne in panicles. Major Drury states, "that it grows to a large size in the Deccan, is very ornamental in leaf, and

* Tennent's 'Ceylon,' vol. i, p. 123. † 'Vegetable Kingdom,' p. 582.

bears sweet smelling flowers." It is also, I am told, very abundant in Burmah, and is of quick growth, yielding annually, after the second year, an abundant crop. It is very common on the West Coast of India, and large plantations are met with it in the vicinity of Bombay. Dr. Roxburgh states, "that it is found only in the vicinity of the sea, where the soil is almost perfect sand." Two or three trees are to be met with in the Calcutta Botanical Gardens, where, however, they seem to thrive indifferently, though they blossom and bear nuts. They produce their insignificant flowers in April, and their crop in the rain season.

Dr. Macfadyen states that "the kernel of the roasted nut is not inferior to the Sweet Almond or Pistachio nut;" and Don mentions that "the broken kernels are sometimes used for mixing with old Madeira wines. It is also an ingredient in puddings." The nuts are sold plentifully in the bazars. They are of the size and form of a small kidney, and have exceedingly thick, hard, polished shells. Between the shell and the kernel is an acrid brown oil, very difficult to remove, and which imparts to the kernels, even when roasted, a pungent taste.

Dr. Macfadyen states that the fruit, consisting of the pyriform fleshy peduncle on which the nut is seated, when stewed with sugar or syrup forms an excellent preserve.

Mr. Dillwyn states that "there is a considerable difference between the East and West India Nuts, and that they are probably of distinct species."* And Mr. Bates, in his description of Santarem on the Amazons, says:

"The Caju is very abundant; indeed some parts of the district might be called orchards of this tree, which seems to prefer sandy or gravelly soils. There appear to be several distinct species of it growing in company, to judge by the differences in the colour, flavour, and size of the fruit. This, when ripe, has the colour and figure of a Codlin Apple, but it has a singular appearance, owing to the large kidney-shaped kernel growing outside the pulpy portion of the fruit."†

Propagated by seed sown during the rains.

Not suited for the hills.

Buchanania latifolia.

Cheronjee.

A large tree thirty feet high, with simple leathery leaves, native of the mountainous parts of Coromandel and Malabar. It produces fruit;

* Review of Rheede's 'Hortus Malabaricus,' p. 12.

† 'The Naturalist on the River Amazon,' vol. ii, p. 22.

the kernels of which are the size of small peas, and are said to be a general substitute for Almonds, and are eaten roasted with milk. There is one solitary tree in the Calcutta Botanical Gardens, but Dr. King is doubtful as to its being the B. latifolia.

LEGUMINOSÆ.

Arachis hypogæa.

GROUND NUT—EARTH NUT—MANILLA NUT—UNDERGROUND KIDNEY-BEAN.

Cheenee Badâm—Môm phulee.

An annual of creeping habit, native of the West Indies and West Africa, but naturalised in all parts of India, well known for its curious property of thrusting its seed-pods, as soon as formed, beneath the earth, to grow and ripen there. It flowers in June, and the crop is ready for digging up in January. The legumes contain two or three irregularly formed beans of nut-like flavour, somewhat resembling the Pistachio, but far inferior. They are eaten raw, but are much better for being roasted.

When the crop is dug up, the old plants should be destroyed, and a fresh piece of ground chosen for sowing the seed for crop of the succeeding season. The seeds are sown in February as for a field crop. The habit of the plant sufficiently indicates that it requires a loose light sandy soil. Plants are rather difficult to eradicate from a piece of ground where once grown.

Not suited for the hills.

Castanospermum Australe.

MORETON-BAY CHESTNUT.

A small tree, native of Moreton Bay in New Holland; produces large pods containing two or three round seeds, somewhat larger than a Chestnut. These when roasted, Don states, have somewhat the flavour of Chestnuts, and Europeans have subsisted on them, when roasted, for two or three days without ill effect.

Young plants have been recently introduced into the Calcutta Botanical Gardens, though the tree seems to have been in existence there in Dr. Voigt's time.

At Bangalore I was shewn a fine tree in the public gardens, which, however, I found was more esteemed for its beautiful large crimson blossoms than for the fruit it yields. The fruit, the gardener told me, no one ventured upon eating; and not even squirrels or birds attacked it. Propagated by seed.

DRUPACEÆ.

Amygdalus communis.

ALMOND.

Badâm.

Dr. Voigt states that the Almond has been tried repeatedly in the vicinity of Calcutta, but without success. And Dr. Roxburgh observes, "it does not succeed in India; and requires much nursing to keep it alive." In the North-West Provinces, however, it is found to thrive to a certain extent, and is rather a beautiful acquisition to the garden, as well for its flowers and peculiarity of foliage, as for its fruit. At Ferozepore I have sown the kernels, and two or three years afterwards gathered fruit from the plants raised from them.

It is the better plan to crack the shells before sowing the seed, in order to remove as much as possible all impediment to the germination of the kernel. Immediately upon germinating, the seed begins to send a tap-root deep down into the earth, thus rendering the plant difficult to transplant without injury. It is therefore best to select the spot where each tree is designed to remain permanently, and, after having prepared the soil, to sow three or four kernels, and if more than one germinate, to destroy all but one.

It can be cultivated on the hills with success in the same way as the Peach.

COMBRETACEÆ.

Terminalia Catappa.

INDIAN ALMOND.

Dêsee Badâm.

A large forest-tree, native of India, of handsome stately growth, with long branches spreading horizontally, and clothed with large, noble, dark-green polished foliage; produces a nut of a fine filbert-

like flavour, with a crispness like that of a fresh Walnut: beyond comparison the most delicious of any kind the country affords. The kernel resembles a small fold of white paper, and is contained in a large green husk of the size and shape of the shell of an Almond, of remarkable toughness. The kernels, when extracted, are generally put on the table in a plate of water.

It blossoms and bears its crop twice in the year. In the month of May it bears a crop, and at the same time comes into blossom with a profusion of small white flowers, closely crowded together upon long spikes, resembling somewhat those of Buddlea Neemda. The second crop comes into season at the beginning of the cold months. Propagated by seed sown in July.

Not suited for the hills.

HALORAGACEÆ ON AGRACEŒ.

Trapa (bispinosa) bicornis.

WATER CALTROPS—WATER CHESTNUT.

Singhâra—Pâneephul.

A common aquatic plant, native of the tanks in Bengal, and much cultivated in many parts of India for the nuts it bears. These are sometimes quite black, of very curious form, resembling a bullock's head, with two large horns. Though much consumed by the natives, they are considered hardly worth eating by Europeans. They are most agreeable when peeled and fried. The plant is rather an ornamental one, especially when in the rain season it opens its pure white flowers towards the close of the day. It is said, however, by Colonel Sleeman, to be very injurious to the tanks in which it is suffered to grow, producing a great quantity of mud, and soon filling up the tank. But this theory scarcely holds good, for it is obviously absurd to say that a plant can "produce" mud. It has recently come to be regarded as a purifier of water in tanks.

PART IV.
THE FLOWER GARDEN.

PART IV.

THE FLOWER GARDEN.

ORNAMENTAL ANNUALS.

FEW persons, perhaps, who in this country care to cultivate a flower-garden at all, would be willing to dispense with Annuals. It is true they are but transitory, but while in blossom they recall, as few things else do so vividly, many pleasing recollections of home and its associations, independent of the enjoyment experienced in the contemplation of their beauty; and, from the time even of their first appearing above ground, through the whole period of their growth, are a never-failing source of interest and delight. Such, as least, I can affirm, has been my happy experience.

For those who do not desire to cultivate more than a limited few, I subjoin a list of such as are never likely to cause disappointment in flowering, if only the seed prove good and germinate.

Acroclinium roseum.
Ageratum Mexicanum.
Aster Chinensis.
Brachycome iberidifolia.
Browallia elata.
Cacalea coccinea.
Calendula pluvialis.
Calliopsis, of sorts.
Callirhoe digitata.
Centranthus macrosiphon
Cuphea purpurea.
Delphinium.
Dianthus Chinensis.
Didiscus cæruleus.
Gaura Lindheimeria.
Iberis.
Ipomœa limbata.
Linaria.
Linum grandiflorum.
Lobelia ramosa.
Lupinus, of sorts.
Malcomia maritima.
Mimulus.
Nemophila insignis.
Petunia.
Phlox.
Portulaca.
Reseda odorata.
Rhodanthe Manglesii.
Salpiglossis.
Stocks of sorts.
Tagates, of sorts.
Tropœolum, of sorts.
Viola tricolor.
Whitlavia grandiflora.

The following is a list of those the seeds of which should be sown in June and July :—

Amaranthus tricolor.
—— caudatus.
—— hypochondriacus.
Balsam, of sorts.
Carthamus tinctorius.
Celosia cristata, and varieties.
Crotalaria juncea.
Datura, of sorts.
Desmodium gyrans.
Exacum tetragonum.
Gomphrena globosa.
Hibiscus giganteus.
——Lindleyi.
Ipomœa rubro-cærulea.
Martynia diandra.
Nicotiana, of sorts.
Nicandra physaloides.
Pentapetes Phœnicea.
Quamoclit vulgaris.
Sesamum Indicum.
Spilanthes oleracea.
Zinnia elegans.

THE TIME FOR SOWING THE SEED.—This in the case of most Annuals is when the rains are over, about the middle of October. In the Upper Provinces, the sowing should take place as soon as the abatement of the heat will allow, in order that the seedlings may be well advanced before the weather sets in at its coldest, during which period they remain quite stationary, making little or no growth whatever. Nasturtiums, for instance, with the pretty Canary Creeper, must be sown in time to make a good growth before the frosty nights come, when they have to be carefully protected from the cold. If the sowing be deferred till the cold season is over, the plants will be killed by the approach of the hot season before they have put forth a blossom.

In Bengal, again, there are certain of the Annuals which take the whole of the time that the cold weather lasts to complete their growth, and only come into blossom just at its close. If the seeds of such kinds be not sown very early, it amounts almost to a certainty that the plants will die without flowering. Among these in particular may be mentioned Cineraria, German Asters, Jacobæa, and Salpiglossis.

Others, on the other hand, blossom within a much shorter period; of such it is advisable always to reserve a portion of the seed for sowing in November. Among these may be mentioned more especially Nemophila and Larkspurs, the seed of which will not germinate till the weather has become quite cold, and when sown early is liable to be lost before germinating.

There are others, moreover, of which if sowings be made much before the approach of the cold weather, the seedlings will spring up so readily as to exhaust themselves by the rapidity of their growth, becoming so attenuated that it requires the greatest care to keep them from perishing. To this may be attributed, as often happens, the damping off of the whole batch of seedlings.

On the hills the most favourable time for sowing Annuals of all kinds is about the first week in March, as the season of flowering extends from April to September and October. There are some species, however, which take a long time to complete their growth, and these must of necessity be sown very much earlier. Among these may be mentioned Cinerarias, Calceolarias, Larkspurs, and a few others. The proper instructions for time of sowing, &c., will be found under the head of such species; as these remarks are only made here in a general sense to show that all Annuals must not be sown at one and the same time.

MODE OF SOWING.—Sowing in pots is, no doubt, the more sure and economical plan; for in that case the seeds are comparatively safe from the ravages of ants, of all things the most to be guarded against.

It is essential that the soil used should be of a loose description, so that there be as little risk as possible of breaking the tender thread-like roots of the seedlings in the process of what is called "pricking out." No better compost can be used than that recommended by Mr. Ross for the purpose, consisting of

Leaf mould	8 parts.
Common mould . . .	8 parts.
Sand	1 part.

The seeds when sown should be covered with nothing more than a mere sprinkling of soil, pressed down upon them gently with the hand, or better, with the bottom of a flower-pot.

It is of the utmost importance that the seedlings should, from the very first have, during the day, all the light and air that can possibly be given them short of absolute sunshine, and at night, when the weather will admit, be put out in the open to receive the dew.

The mode of raising Annuals, however, attended with least trouble is to select a small plot of ground just the sufficient size for the purpose; well dig it, and make it very light and mellow with vegetable mould, and perfectly level. Then divide it off into little compartments, and in each sow a different kind of seed, and affix a label. But a better plan yet, in my opinion, is to draw drills over the plot at the distance of half a foot between each drill, and sow in them the different kinds of seed in succession. It is thus known exactly where to look for the seeds to come up; when up also they are far more easily transplanted from drills than when the seed has been sown broadcast. Still, whichever plan is adopted, the whole plot must be sheltered from the sun during the day, and in bad weather at night, with a covering of hoogla, supported on a bamboo frame about three feet from the ground. About four-and-twenty hours previous the soil should be well drenched so that at the time of sowing, without being wet and cloggy, it may be found moist and mellow.

The disadvantage of this plan, and nearly the only one, I believe, is that the greater portion of the seed is apt to be carried off by red ants; but this is of not so great importance if seed is abundant, as quite enough will probably be left to supply as many plants as are required. The seedlings come up with far greater vigour and robustness than they do when raised in pots, and never damp off.

On the hills the best plan is to sow in pans, which should be kept sheltered, not from the sun as in the plains, but from the cold. For this purpose it is desirable to keep the pans in glazed frames, having bottom heat; or, better still, in a green house, if such a structure is available, until the seedlings have made some growth, when the hardier kinds might be planted out in beds and borders, and the more tender varieties pricked out into other pans and pots. If no glazed

protection is available, the shelter of a verandah to keep the pans in at night will be found sufficient, unless the month of March is particularly cold and raw, as sometimes happens. In the latter case it will depend very much upon individual and local circumstances in what way young seedlings must be protected from cold in severe frosty nights.

TRANSPLANTING.—"Annuals," says Sir J. Paxton, "with the exception of a few particular sorts, all will derive great benefit from being transplanted. It will check the natural exuberance of their growth, and promote the production of flowers."* "I am convinced," says Mr. M'Meekin, head-gardener formerly to the Agri-Horticultural Society, "that Annuals in this country are improved by transplanting."

It must be observed, however, that the season here is of so much shorter duration for Annuals to mature their growth in than it is in Europe, as well as the length of the day so much shorter, that many cannot allow of the check of their growth which a transplanting always more or less causes. As a general rule for guidance in this matter, I have observed, with regard to all herbaceous plants, as well as Annuals, that those which love a rich, damp soil, such as Mimulus, Nemophila, German Aster, Cineraria, Balsams, &c., in no way suffer, but are rather benefited by transplantation; while those plants the natural locality of which is a dry, arid soil, such as Lupins, Portulaca, Poppy, Eschscholtzia, Mignonette, &c., suffer severely and often irrecoverably from the process.

On the hills, however, no such fears are entertained, as the season is as long as that in England, and nearly every species may be transplanted with advantage. But great care is necessary as to watering seedlings.

Seeds of Annuals, such as it has been stated, suffer too great a check from being transplanted, may, especially when seed is plentiful, be very advantageously sown at once in the border on the spot where they are to remain. The following excellent directions, given by Sir J. Paxton on the subject, apply equally well in this country as in Europe:—

"Make the soil fine with the hand. With the finger draw a circular drill of about six inches in diameter, and one inch or less deep. Cover the seeds lightly with moist soil. Place an inverted flower-pot over them, and allow it to remain till the seeds begin to grow. Then prop it on one side two or three inches high, until the plants are able to bear the weather. Afterwards remove it altogether."†

The seed must not be cast merely on the hard, dry soil of the border, but a little mellow leaf-mould or old well-decayed cow-manure

* 'Magazine of Botany,' vol. vi, p. 96.
† 'Botanical Magazine,' vol. i, p. 19.

be mixed up with the soil on the spots where the sowings are to be made.

Annuals in the border require daily watering. The plan of flooding the border in the Upper Provinces is very prejudicial to some kinds, causing them to rot at the collar of the stem just previous to blossoming. With a little care this may be easily prevented. If the border be perfectly level, as it ought to be, water may be let in upon it just sufficient to crawl over the ground till it wets the whole surface. This is best done in the morning. If done in the afternoon, the frost, acting upon the damp soil, will be far more likely to cause injury to the plants.

GRAMINACEÆ.

GRASSES.

Though the list of Annual Grasses put forth by seedsmen is rather considerable, there are few perhaps which, for their ornamental character, are really worth cultivating in this country. Possibly the ones here given may be as many as are desirable, and even these, though succeeding well in the Upper Provinces, I have found thrive very unsatisfactorily in the vicinity of Calcutta. Some of the wild grasses on the hills are really beautiful, but it is not, to my mind, worth the trouble to cultivate them in gardens, unless one has a particular fancy for ornamental grasses.

Briza.

B. maxima and B. gracilis—QUAKING GRASS.—Very beautiful when bearing their heads of blossom, resembling little heart-shaped lockets suspended from delicate thread-like stems, and moving constantly with the slightest breeze. A pot of either species placed amongst other annuals affords pleasing variety. Sow in October on the plains, and in March on the hills.

Stipa.

S. pennata—FEATHER GRASS.—A very beautiful Grass, its group of stems bearing resemblance, after blossoming, to a delicate tuft of whitish feathers, like the tail of the Bird of Paradise. The dried stems, when cut, form a pretty permanent indoor ornament. Sow in October on the plains, and in March on the hills.

EUPHORBIACEÆ.

Acalypha.

The annual species comprise a genus of plants of low growth, ornamental only for their foliage, the leaves being of a neat form, with the under-surface of a bright red colour. Two or three are natives of this country, and look pretty in the way of variety amongst other potted plants.

VIOLACEÆ.

Viola.

V. tricolor—HEARTSEASE—PANSY.—Though a perennial, the Heartsease must, in this country, be cultivated as an annual, and raised fresh from seed each cold season, for it is only in very rare cases that it can be preserved through the hot and rain seasons. The seed should be sown about the middle of September in Upper India, in March on the hills, and in Calcutta and Lower Bengal in October, and the young plants, when having formed about six leaves, be pricked out into small pots, one in each, or three in eight inch pots. They should be removed carefully, so as to disturb the soil as little as possible, for some of the seeds do not germinate till a long time after others. The Heartsease likes shade and plenty of water, and a soil well enriched with old cow-manure. It is important, however, that the soil should be rendered of an open nature, by the addition of river sand, or the plants are apt to turn yellow and sickly.

The following mode of treating the plant is given by Sir J. Paxton :—

"When grown in pots, train the plant upon a single stem, until it has attained the height of one foot, or eighteen inches (which it will readily do), then pinch off the extreme points ; it will throw out side branches in profusion, and will have a strikingly pleasing appearance."*

The Heartsease, however, is a florist's flower, and plants raised from seed may probably, with all the trouble bestowed upon them, turn out worthless, particularly if care has not been taken to sow seed saved from the finest sorts. It can be grown as a perennial on the hills, where the plants can easily be raised from cuttings put down in sand under glass.

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* 'Magazine of Botany,' vol. iii, p. 6.

BRASSICACEÆ.

Matthiola.

M. annua—TEN-WEEK-STOCK—GERMAN STOCK—BROMPTON STOCK.—These are all varieties of the same, and differ very little from each other except in the size and form of their blossoms. English Seedsmen's catalogues contain many so-called varieties. Stocks thrive vigorously enough in the vicinity of Calcutta, till they are just about to blossom, when they all but invariably are infested with a minute kind of insect, assume a cankered appearance, and become utterly worthless. The only way to avoid this is to keep a careful watch on the plants, and upon the first sign of the insect, to sprinkle the plants with wood ashes. I have raised numbers year after year, but never yet succeeded in obtaining a single satisfactory spike of blossom, nor during several years that I have attended the horticultural shows in Calcutta have I seen one there. In Upper India, on the other hand, it thrives and blossoms to perfection.

The seed should be sown on the plains in October, in the open ground, in a spot protected from the effect of both sun and rain; when sown in pots the young seedlings are exceedingly apt to damp off. On the hills, the seed must be sown in February and March, in pots or pans, in frames, with bottom heat if possible; or in the green house. The soil should be sandy and light, and the young plants should be starved of water till about two inches high, when they should be transplanted into very rich soil. Sir J. Paxton remarks, "those which remain where sown will be the better plants, as stocks are very much checked by transplanting." This, indeed, accords with most persons' experience. One thing moreover is certain, that the attempt to move a stock when in blossom, or on the eve of blossoming, is at once to destroy it.

Koniga.

K. maritima—SWEET ALISON OR ALYSSUM.—A dwarf, pretty, unpretending annual, bearing small conical heads of little white flowers, that emit a pleasing honey-like fragrance. Sow in large patches in October on the plains, and in March on the hills. The plant will be in full blossom by the middle of December on the plains, and in May on the hills.

Iberis.

1. **I. odorata**—WHITE CANDY TUFT.—Of easy culture, thriving well everywhere; plants raised in clumps in the border present a

large pleasing mass of white blossom. Sow in October on the plains, and in March on the hills.

2. **I. umbellata**—PURPLE CANDY TUFT.—Of somewhat larger growth than the preceding; produces handsome showy masses of pale purple blossoms, but sometimes rather shy of doing so. The English seedsmen's catalogues contain lists of other varieties also; but the above can always be relied upon.

Malcomia.

M. maritima—VIRGINIA STOCK.—A dwarf, unpretending annual, well adapted for an edging or to be planted in clumps, producing then in effective masses its small lavender-coloured flowers. Sow in October on the plains, and in March on the hills, in enriched soil.

Erysimum.

1. **E. Perofskianum**—YELLOW STOCK.—Resembles an orange-coloured Wall-flower, but with much larger heads of blossom. Sow in the border in October on the plains, and in March on the hills; no care required in its culture.

2. **E. Arkansanum.**—Like the above, but with pale yellow heads of flowers, bearing rather too great a resemblance to those of the Turnip or Mustard.

Cheiranthus.

C. Cheiri—WALL-FLOWER.—This is a perennial, but is cultivated as an annual on the plains. The seed should be sown in October, and treated in the same way as the stock. On the hills sow in March, and transplant into pots and borders, where the plants will go on blossoming throughout the year. Must be protected in the winter.

Heliophila.

H. arabioides.—A small plant, bearing small, brilliant blue, not very remakable flowers, rather pretty; grown in pots. Sow in October on the plains, and in March on the hills.

Schizopetalon.

S. Walkeri.—A small plant bearing exceedingly pretty, pure white, deliciously-fragrant flowers, with the petals cut in a most cu-

rious way. It likes a light sandy soil, and should be sown in the spot where it is to remain, as it bears transplanting very ill; it is of delicate habit, and on the plains very apt to perish just as the flowers are about to expand. Sow in October on plains, where it blossoms by the end of January. On the hills sow in March.

RESEDACEÆ

Reseda.

R. odorata—MIGNONETTE.—No particular directions need be given for the culture of this familiar, sweet-scented plant, except that it bears transplanting ill, and that the seed should be sown in October on the plains, and in March on the hills, thinly in patches where the plants are to remain. It may be kept alive and in blossom a very long time, if the flower-heads be cut off when they begin to form seed-vessels. It will succeed in nearly any soil, and in gardens where it has been grown one season it will come up self-sown the following. Several fine varieties have been raised of late producing exceedingly large trusses of flowers, some white, and some of a deep dull red.

To form what is called the Tree-Mignonette, Mr. Cuthill directs as follows:—

"Sow in a four-inch pot. When up, clear off all the plants but the one in the centre. As it grows, train it upwards to a stick, until it is a foot high, or two, if you please. Do not allow any side shoots to grow on the stem, and remove all leaves to within a few inches of its top. When the plant gets as high as you wish, top it, and then it will throw out side branches. As they advance pinch off their tops, till you have formed a nice bushy head to your plant; and, above all, do not allow any bloom to appear until it has become strong.

"Mignonette delights in a sandy loam, not too light; but being a gross feeder, a little diluted manure-water may be given it once a week with advantage. If this is contemplated, the mould need not be made so rich in the first instance." *

It must be mentioned, however, that the large bushes, between two and three feet high and the same in breadth, exhibited in England, are the result of two years' growth, and the above plan can only be carried out on the hills.

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* 'Gardeners' Chronicle,' No. 21, for 1860.

CAPPARIDACEÆ.

Cleome.

A genus of tropical plants, including about thirty varieties, only one of which is fround in Indian gardens.

C. viscosa.—Grows with an erect stem, two feet high, bearing rose-coloured flowers, curious for the immense distance the pistil with the seed-vessel at the end projects out from among the stamens. The flowers, poor in themselves, form a pretty object clumped several together in a tuft-like head on the summit of the plant. Sow the seed in October on the plains, and in March on the hills.

STERCULIACEÆ.

Pentapetes.

P. Phœnicea—*Doopahârya.*—The only representative of this genus. A native of India and a common weed of the rice-fields, but well deserving a place in the garden. It has an erect stem about two feet high, bearing a spike of middle-sized beautiful flowers, unrivalled for their deep carmine colour. There is also a white variety. Sow the seeds in July. The plant blossoms in September and October. Seed may also be sown in March in Upper India, and plants will bloom throughout the hot season. It will not thrive on the hills, except under glass. Sow in April.

TROPÆOLACEÆ.

Tropæolum.

1. **T. majus**—NASTURTIUM—INDIAN CRESS.—A more beautiful and showy annual than the Nasturtium is not to be met with. In Lower Bengal, scarcely any more care is required in its cultivation than having first enriched the soil with a little old manure, to drop a few seeds in the places where the plants are intended to remain, and to keep the earth moist by daily watering. The seed may be sown in the middle of October, and the plants will be in full bloom by the middle of December, and continue so till the hot weather sets in. But in the North-West Provinces the plants must be covered over at night, or they will be sure to be destroyed by the frost. Nor will it answer to delay the sowing till the frosty nights are over, as in that

case the plants will perish by the heat before coming into bloom. On the hills they may be sown in succession from March to May.

The number of varieties is very great, producing flowers of a pale straw colour, orange, scarlet, dark rich crimson brown, and of every intermediate hue, spotted and striped. The dwarf varieties, called Tom Thumb, grow compact little plants, without the tendency to send out runners, as is so much the habit of the larger kinds. They yield seed in abundance, which, when gathered, should be thoroughly dried and kept till sowing-time in well-closed bottles.

2. **T. peregrinum**—CANARY CREEPER.—A pretty slender creeper, bearing small canary-coloured flowers, growing in course of time to a considerable height, and requiring a trellis for its support. It cannot endure heat; and the seeds must not be sown till the cold weather is well set in, or the young plants will be sure to die off. Sow in March on the hills.

Limnanthes.

L. Douglasi.—A low trailing plant, producing poor, miserable flowers, not equal to those of a common Buttercup, which they somewhat resemble. Sow the seeds where the plants are to remain, in a moist, shady situation, in October on the plains, and in March on the hills.

MALVACEÆ.

Malope.

M. trifida, *var.* **grandiflora.**—A high-growing, tolerably showy annual; bears large, dull-red, mallow-like flowers; sow the seeds in October on the plains, and in March on the hills, in the spot where the plants are to remain, as they suffer severely from transplanting. In the neighbourhood of Calcutta I have often found this plant thrive well till just when about to blossom on the approach of the hot weather, and then die off without opening a single flower. There is a variety with white flowers.

Althæa.

A. rosea—HOLLYHOCK.—By nature a perennial, the Hollyhock can only be cultivated satisfactorily on the plains as an annual. The seed should be sown in October in the open ground, for young plants raised in gumlahs are not only very apt to damp off, but suffer much also from transplanting. The best plan is to have some bed of good

light rich soil, set apart exclusively for this plant. In poor soil it makes no growth and produces no flowers. On the hills the Hollyhock is seen to best advantage. Sow the seed in rich soil in March where the plants are to remain. A border devoted exclusively to them is a grand sight when in full bloom.

Callirhoe.

C. digitata.—A most delightful annual; thrives well in gardens about Calcutta, and bears, in great profusion, moderate-sized, bright pink blossoms: sow the seed (which may be saved from year to year) in October on the plain, and in March on the hills, and put the plants where wanted, either in rows or in patches.

Hibiscus.

1. **Africanus**—*Syn.* **Trionum.**—An annual of trailing growth; bears beautiful cream-coloured flowers with deep puce-coloured eye; likes a light sandy soil; sow in October on the plains, and in March on the hills: the plants come early into blossom, and produce seed abundantly, which should be saved from year to year.

2. H. **calisureus.**—A plant of more erect growth, and with flowers somewhat larger than those of the preceding, otherwise very similar.

3. **H. Lindleyi.**—A large shrub-like plant, bears during the rain season, in constant succession, a profusion of large, rich crimson, very showy blossoms; sow the seed in July on the plains, and June on the hills.

4. **H. giganteus.**—A very large plant, producing during the rains great, showy, primrose-coloured flowers of the size of a cheese-plate, with puce-coloured centre. Sow in June, both on the plains and on the hills.

SAPINDACEÆ.

Cardiospermum.

C. Halicacabum.—HEART-SEED—BALLOON-VINE.—A creepingp lant, a common weed of this country; produces insignificant flowers, but is sometimes cultivated for its graceful foliage and the numerous singular inflated seed-vessels it bears; seed may be sown at any season. Scarcely worthy of a place in the garden.

RANUNCULACEÆ.

Adonis.

A. autumnalis—FLOS ADONIS—PHEASANT'S EYE.—A cheerful little plant, with dense foliage of deep-green, finely-divided leaves, out of which peer forth its small, vivid crimson flowers; thrives best in a moist and shady situation; sow in October on the plains, and in March on the hills.

Nigella.

N. Hispanica.—DEVIL-IN-A-BUSH—FENNEL-FLOWER.—A not very pleasing annual; interesting principally for the curious way in which the largish blue flowers are surrounded by the fennel-like foliage. Sow in October on the plains, and in March on the hills; it requires shade and moisture.

Delphinium.

1. **D. Ajacis.**—ROCKET LARKSPUR.
2. **D. consolida.**—BRANCHING LARKSPUR.—This annual is so well known, that no detailed description is necessary. The seed should be sown where the plants are intended to remain, as transplanting hinders their growth. It is no use sowing before the middle of November in Upper India, and in the vicinity of Calcutta before the beginning of December, as that sown earlier only lies in the ground, and will not germinate before the cold season is thoroughly set in. If the ground where Larkspurs have grown one season be left undisturbed, an abundant crop of self-sown plants will spring up the following November and December.

On the hills, Larkspurs are seen to great advantage. Seed should be sown about the end of February, or the beginning of March, as soon as the snow has melted away. The plant requires a rich soil to bring it to perfection.

PAPAVERACEÆ.

Papaver.

1. **P. Somniferum**—POPPY.—The varieties of Poppy, both as regards size and colour, are very numerous, bearing the names severally of Pæony, Ranunculus, and Carnation-flowered. The seed should be sown in October on the plains, and in March on the hills, in the open ground

in light rich soil, where the plants are to remain, as they do not bear transplantation. Seed procured from Europe cannot often be depended upon to germinate; hence when a good kind has once been raised, care should be taken to save the seed of it from year to year.

2. **P. Rhæas**—FRENCH POPPY.—A smaller plant than the preceding, and distinguished from it by its much divided leaves and hairy flower-stalks. Same treatment as for the preceding.

Eschscholtzia.

E. Californica—CALIFORNIAN POPPY.—A very showy plant, with hoary green, much divided foliage; bears a profusion of large, expanded, bright-yellow flowers. In the gardens of Upper India it is always to be counted on as a splendid ornament during the cold months; but, in the vicinity of Calcutta, though it grows vigorously, and in some seasons affords a tolerable display of flowers, it more commonly fails of yielding a single blossom, nor becomes at all the more disposed to do so from being preserved, as it may be, till the following cold season. The seed should be sown in October, where the plants are to remain, as "when transplanted," Sir J. Paxton observes, "they are a very long time before they commence growing again." Hunnemannia fumariæfolia is in many respects very similar, and blossoms freely in the middle of April. On the hills the seed should be sown in March.

There are several varieties varying in colour from pale straw to deep yellow and pink.

Platystemon.

P. Californicum.—A small delicate plant of trailing habit, with grass-like foliage of ash-green tint; bears beautiful little snow-drop-like flowers of a pale lemon colour. The plants are attached to the soil by such a slender, thread-like stem, that they cannot be transplanted without being greatly injured, if not destroyed. I have not found it succeed well in Bengal. The seed should be sown in Upper India in October, and on the hills in March, where the plants are intended to remain permanently.

LINACEÆ.

Linum.

L. grandiflorum, *var.* **kermesinum**—SCARLET FLAX.—A delightful annual; bears in great profusion largish, expanded bright-crimson

flowers; thrives and blossoms in great beauty in India, and yields seed abundantly, which may be saved from year to year; sow in October on the plains, and in March on the hills. The young plants require to be transplanted cautiously, or are likely to suffer. I have never found them answer in pots so well as in manured soil in the border.

OXALIDACEÆ.

Oxalis.

O. rosea.—A very pretty little unpretending annual; bears numerous small rose-coloured flowers, but very effective when grown in masses. Grown beside this the new species. **O. Valdiviana and Tropæoloides,** form a very pleasing contrast, with their numerous cheerful yellow flowers. **O. corniculata** is a pretty plant with compact purple-brown foliage and yellow flowers. These three last, though perennial, may be grown as annuals. Sow the seed in October on the plains, and in March on the hills.

BALSAMINACEÆ.

Impatiens.

I. Balsamina—BALSAMS—*Gool Mehndee.*—Native of India. In a garden where plants have once been grown, seedlings will be sure to come up self-sown each succeeding season; but these will be weedy, worthless plants, and should be pulled up and thrown away. The finer kinds, raised from imported seed, produce immense double flowers, resembling full-blown Camellias, of various colours—white, rose, scarlet, purple, and variegated—and are about the most lovely of all annuals.

A very great mistake, I believe, is usually made in regard to the time of sowing the seed. Sometimes it is sown in July in Bengal, and the consequence is that many of the young plants perish from the wet, while those that manage to survive come into blossom only to have their flowers destroyed or damaged by the heavy rains. Again, the seed is often sown in October, with that of the other annuals; but the Balsam requires more warmth than it meets with at that season to make much growth. I have found that by sowing the seed in Calcutta, about the beginning of September in pots, large, well-grown plants may be obtained by the close of the rains. If at that time

the plants thus raised be put out in the border in well-enriched soil, they will blossom in perfection and preserve their beauty unimpaired for a very long time. In Upper India, however, the best time to sow the seed is in June, about the commencement of the rains. Balsams, moreover, put out in the border during the rains, I have often noticed perishing from no apparent reason; but, on pulling them up, and splitting the stalk with my thumb-nail, I have invariably found in them a great maggot that had devoured the substance of the interior. I know no preventive against this.

In planting out the Balsam, the stem should be sunk up to the leaves. Or if it be grown in a pot, the pot should be several times changed, a very small one taken first, and a larger one each time, and each time the stem should be buried up to the leaves in the soil. Balsams love a light rich soil and plenty of water.

On the hills, the best time for sowing is about the end of March in pots under glass. The plants should not, however, be put out in the beds and borders before the end of April. In all other respects the treatment for the plains will suit on the hills. The wild varieties found on the hills have a most beautiful effect when in full bloom in July and August. Great patches of them cover the hill side, in all shades of colour from white, pink, scarlet, and yellow. The flowers, however, are single and insignificant in size.

In the Journal of the Agri-Horticultural Society, vol. ii, 2nd series, will be found a paper by Mr. J. Scott, giving a description of several species of Balsam of this country, of some of which he speaks highly. But the one or two that I am myself acquainted with seem to me of too straggling and weedy a growth for whatever merit there may be in their flowers to compensate for. The description of the following plant, and directions for cultivating it, are from the same paper in Mr. Scott's own words:

"Hydrocera.

"**H. triflora**—*Domootee*:—An aquatic, with lanceolate leaves four to five inches long and one broad. Flowers large, white, variegated with red and yellow. It well deserves a place in the garden. Cultivate in gumlahs half-filled with ordinary garden-soil; watered till become mud. Sow seed in February, or beginning of March; add water as the plants grow—two or three inches above the surface of the soil quite sufficient to keep the plant in vigorous health. It flowers continuously to the commencement of the cold season, when it begins to die down. If the gumlah be undisturbed, self-sown seedlings appear abundantly next year."

CARYOPHYLLACEÆ.

Dianthus.

D. Chinensis—CHINA PINK.—One of the most beautiful and satisfactory of our cold weather annuals. Naturally a perennial plant, but best treated as an annual in this country; most easy of cultivation; best grown in large clumps, so as to produce a large profuse of blossom with flowers of endless variety, scarcely two alike. To keep up a succession of bloom, the flowers should be cut off as soon as they fade, and not be allowed to run to seed. Sow in October on the plains, and in March on the hills.

LIBRARY

Saponaria.

S. Calabrica—CALABRIAN SOAPWORT.—A dwarf annual, very easy of culture, and requiring no care; bears deep, rose-coloured flowers of the size of the Forget-me-not; when blossoming profusely, has at a distance an effect like that of bright Heather. Sow in October on the plains, and in March on the hills.

Silene.

CATCHFLY.

A genus of annuals bearing small pink flowers; ornamental only when grown in clumps and blossoming in great profusion. 1. **S. Armeria**—LOBEL'S CATCHFLY.—Bears its flowers in compact heads, and for that reason one of the most desirable of the genus. 2. **S. pseudo-Atocion.**—Pleasing for the freshness of its leaves, but in this country bears its flowers too scantily to be very attractive. Somewhat similar in character are 3. **S. pendula** and its varieties. Sow in October on the plains, and in March on the hills.

Viscaria.

1. **V. rosa cœli**—ROSE OF HEAVEN. 2. **V. oculata.**—Bear pretty pink flowers, but require to be grown in large clumps, as the flowers are only effective when produced in large numbers. Sow in October on the plains, and in March on the hills.

PORTULACACEÆ.

Portulaca.

P. grandiflora.—Of which there are many varieties, both with single and double flowers. A bed of this plant when in full blossom I have heard aptly likened, for the brilliancy and variety of colour in the flowers, to a stained-glass window. Nothing in the garden can equal it in dazzling beauty of effect. The beauty of the bed, however, is of short duration, as the flowers do not open till ten o'clock, and close again by about two in the afternoon.

The seed should be sown where the plants are to remain, as they bear transplanting very ill. They do better in the open ground than in flower-pots. If sown in the ground in October on the plains, and in April on the hills, the seed will germinate, and the plants become of strong, large, healthy growth before requiring to be watered; whereas in pots the soil soon dries, and the young plants on first germinating are either destroyed by drought from being left unwatered, or if watered, by the force of the water as it issues from the watering-pot. The best way of growing this delightful annual is to make one or more small circular beds of a fine mellow soil, in a conspicuous and sunny situation; and having well watered them with a watering-pot, shortly afterward sow the seed; cover the beds with a jhamp or matting till the seeds germinate, and then remove it. To distribute the seed evenly, I have found it an excellent plan to mix a pinch of it well in a teacupful of dry silver sand, and sprinkle the mixture by throwing pinch after pinch over the ground; by this means it is made certain that the seed will not be sown too thickly, nor more of it fall upon one part of the bed than on another. After this a slight sprinkling of pure sand may be made, and the sowing then covered over with the jhamp.

To save seed, gather the seed-vessels a little before ripe, for if left to ripen on the plant the cap of the seed-vessel drops off and the seed falls out and is lost. If the ground in which Portulaca has grown be left undisturbed, plants commonly come up self-sown the following season.

Calandrinia.

C. umbellata.—A beautiful annual; produces crowded umbels of crimson flowers of the size of a four-anna piece, which open only in the sunshine; does not bear transplanting well, but succeeds best with the treatment recommended for Portulaca. To have fine flowers Sir J. Paxton directs that it should be watered once or twice with liquid manure. Sow in October on the plains, and in April on the hills.

NYCTAGINACEÆ.

Abronia.

1. **A. umbellata.**—A very beautiful trailing annual; bears globular heads of lilac, fragrant flowers, in character much resembling those of a Verbena. The seed should be sown in October on the plains and in March on the hills, and the plants will be in full blossom in February and June, respectively; and will die off on the first approach of the hot weather on the plains. The young seedlings require great attention, as being of a succulent nature they are very apt to damp off, as well as to be devoured by birds. They are best planted out in wide pans about eight inches deep.

2. **A. arenaria.**—A new species, producing yellow honey-scented flowers.

AMARANTACEÆ.

Gomphrena.

G. globosa—GLOBE AMARANTH—*Gool-Mukmul.*—One of the most valuable annuals of our Indian gardens, which it enlivens with a perpetual profusion of its ball-formed purple, orange, and white blossoms, throughout the whole rain season. Sow the seed in June, both on the plains and on the hills. A "Hen and Chicken" variety is sometimes met with.

Amaranthus.

1. **A. tricolor.**—An annual remarkable for some of its leaves being blotched with red, and others of them entirely of that colour. Sow the seed in July on the plains, and in June on the hills. A single patch of two or three plants is pretty enough, but many of them present rather a weedy appearance.

2. **A. caudatus**—LOVE-LIES-BLEEDING.—A well-known old plant of the English gardens, with drooping tail-like flower-stems of crimson flowers. 3. **A. hypochondriacus**—PRINCE'S FEATHER.—The leaves and stems of this beautiful annual are of a rich crimson entirely, as well as are the flowers and upright plume-like branches. Sow the seed in July on the plains, and in June on the hills.

4. **A. salicifolius.**—A new and very beautiful species, three feet high, in the form of a plume, with long narrow weeping leaves, shaded bright orange-red.

There are other varieties, *viz.*, **Melancholicus ruber, Atropurpureum nanus,** and **speciosus aureus,** yellow. All require the same treatment.

Celosia.

C. cristata—COCKSCOMB—*Moorgha—Gool-Kesh.*—Many varieties of this very handsome annual are met with in the gardens of India. The seed of each should be sown in July, and the plants will be in full beauty of bloom in December. They love a rich soil, and if grown in pots frequent shifting is recommended. Some of recent new varieties and hybrids produce immense heads of blossoms of great beauty, and in a great variety of colour. Sow in June on the hills, and transplant frequently.

MESEMBRYACEÆ.

Mesembryanthemum.

FIG-MARYGOLD.

Dwarf succulent plants. **M. tricolor,** bears somewhat small daisy-formed crimson and white flowers of dazzling beauty, which open only in full sunshine; **cordifolium** pink, and **pomeridianum** large brilliant yellow flowers. Sow the seed in October on the plains, and in March on the hills, in wide shallow pans filled with good soil below, but very sandy just on the surface. A pane of glass laid on the pan will tend to keep the soil moist till the seeds germinate.

M. Crystallinum—THE ICE PLANT.—A native of the Canary Islands. Remarkable chiefly on account of its large fleshy leaves, having the appearance of frosted glass. Sow in October on the plains, and in March on the hills.

PAPILIONACEÆ.

Lupinus.

LUPINS.

Of these annuals there are a great many species and varieties, all more or less beautiful. Their fault is that they run to seed so rapidly. The seeds should be sown in October on the plains, and in March on the hills, in the spots where the plants are to blossom, as they bear transplanting very indifferently.

1. **L. hirsutus.**—The old familiar blue Lupin, with large rough seeds and the variety with white or rose-coloured flowers sometimes termed pilosus. Before sowing throw the seeds into a basin of water

and reject those that float. Sow the sound ones by threes in a spot eight inches apart. The plants require scarcely any water, grow fast, and blossom considerably earlier than any of the dwarfer kinds. To save seeds, when the pods on the lower part of the flower-stalk have grown to nearly their full size, the tops of the stalks should be pinched off, and the plants carefully taken up and potted, and placed in some shady place, where the seeds will ripen gradually and remain plump. If the plants are left exposed to the sun in the open ground the seeds are apt to dry and shrivel up instead of ripening.

2. **L. luteus.**—The well-known old yellow Lupin with speckled seeds. The seeds are very hard, and should be soaked in hot water to soften them before being sown. Those, however, imported from England, more commonly than not, fail of germinating: care should therefore be taken when plants have been once raised to save seeds from for sowing the following season; or seeds might with advantage be obtained from the Nilgherries, where in neglected gardens I have seen this as well as other species of Lupin growing like a weed in great profusion, and ripening seed in abundance in September.

3. **L. Menziezi.**—Also a yellow Lupin, and spoken of as one of the handsomest. The remaining are comprised in **L. Hartwigii,** with white, blue, and red varieties: **L. mutabilis** and **L. hybridus,** with several varieties of party-coloured flowers, and **L. nanus,** a very delightful little species.

Crotalaria.

RATTLEWORT.

There are many species natives of this country, for the most part weedy-looking plants, bearing yellow Lupin-like flowers.

C. juncea.—From which the common fibre, called *Sun,* is manufactured: is one of the prettiest, and, when in bloom in the cold weather, much resembles the Broom of the English gardens. Sow in October on the plains, and in March on the hills.

Clianthus.

C. Dampieri.—Native of Australia, a small shrub, with hoary pale-green pinnate foliage: bears large handsome scarlet and black parrot-beak-formed flowers. It is very liable to die off if much disturbed. Treated as an annual it has been found to succeed admirably in India,

and specimens of it in flower are now usually exhibited at the Calcutta shows. Dr. Beaumont of Indore says :—

"In October or November it should be sown in an open border freely exposed to the sun, and if not transplanted or interfered with, flowers freely and to a certainty. The roots are so fine and easily broken, that to transplant is to kill the seedlings."

Sow in October on the plains, and in March on the hills, in light rich soil, in pots, three seeds in each; and do not move the plants. Water carefully.

Lathyrus.

1. **L. odoratus**—SWEET PEA.—In the Upper Provinces the Sweet Pea, raised from imported seed, blossoms freely; but in the vicinity of Calcutta, though the plants continue to flourish vigorously till the approach of the hot season, they die off then, very often without having produced a single blossom. This I have experienced again and again. In the latter locality, therefore, none but acclimated seed, when procurable, should be sown, as this never fails of flowering abundantly. The seed should be sown in October in the places in the border where the plants are to blossom. Draw a circular drill with the forefinger about ten inches in diameter, into which drop the seeds an inch apart. When the plants are half a foot high, sticks must be stuck in the ground for their support. On the hills the Sweat Pea comes to perfection, and should be sown in March, in a light rich soil, in the place where it is intended to bloom. A writer in the 'Gardeners' Chronicle' states :

"There are several varieties of Sweet Peas : many years of observation has shown that the white-flowered Sweet-Peas seldom, if ever, vary; but that in proportion as the flower becomes darker in colour so is the liability to vary greater." *

English Seedmen's Catalogues contain a list of many varieties, and it is best, in my opinion, to get a packet of the choicest mixed, from which seeds should be saved for future sowing.

And Mr. Darwin says :

"To keep up a mixed stock of even such extremely close varieties as the variously-coloured Sweet Pea, they must be each year harvested separately, and the seed mixed in due proportions, otherwise the weaker kinds will steadily decrease in numbers and disappear."†

In this country plants from acclimated seed produce scarcely any but pink and white blossoms. And if it be true, as stated in seedsmen's

* 'Gardeners' Chronicle,' No. 21, for 1860.
† 'Origin of Species,' p. 76.

lists, that the black and purple varieties are natives of Sicily, and the light-coloured ones of Ceylon, it may be easily conceived how those congenial to the climate are preserved, and others die out.

2. **L. Magellanicus**—LORD ANSON'S PEA.—Between this and a common weed in Bengal, which bears small bright blue flowers, there seems to be scarcely a perceptible difference.

3. **L. Tingitanus**—TANGIER PEA.—I have often raised plants of this in my garden, but they never produced flowers.

Hedysarum.

H. coronarium—FRENCH HONEYSUCKLE.—A pretty little bushy plant with neat dark foliage; bears curled spikes of dull-red vetch-like flowers. Sow in October on the plains, and in March on the hills; but in the vicinity of Calcutta it rarely flowers.

LYTHRACEÆ.

Cuphea.

C. purpurea.—When grown in good rich soil, a beautiful little annual; bears its pretty fringed pink, purple, and crimson flowers, somewhat like those of Lagerströmia, three or four weeks from the time of sowing. As the plants decay, fresh ones from self-sown seeds almost immediately supply their place in continued succession for a great length of time. Sow in October on the plains, and in March on the hills.

GENTIANACEÆ.

Exacum.

E. tetragonum.—A native of swampy fields in Bengal; bears, during the rains, large beautiful azure-coloured flowers with golden authers; well deserving a place in the garden, though I have never yet met with it there. It is never grown on the hills.

Sow the seed in the beginning of June on the plains in Bengal.

SOLANACEÆ.

Petunia.

The Petunia has in recent years been hybridized and brought to such perfection that it is now classed as a Florist's flower. The double and fringed varieties are very lovely and in all shades of colour, from a

light pink to a deep crimson and purple, with blotched, striped, and edged varieties. English seedsmen now produce separate "strains" of Petunias, which should be imported separately once and thereafter seeds saved from them. The following are the two varieties commonly met with in Indian gardens :—

1. **P. nyctaginiflora.**—With white, sweet-scented flowers, and
2. **P. Phœnicea.**—With bright crimson flowers, together with their numerous hybrids, producing flowers of every shade of colour intermediate between the two, and in particular one with a green border, are, while in full beauty of bloom, about the most brilliant ornaments of the garden. By nature a perennial, the Petunia can in this country be cultivated only as an annual; but in gardens where it has been once grown, it thoroughly establishes itself, coming up self-sown on the approach of each cold season. These self-sown plants blossom in January, are rampant in their growth, and generally lose their hybrid peculiarities and resume their original type. It is best therefore to procure fresh seed from Europe annually. Sow in October in pans, and put out the plants when two or three inches high; these will not come into blossom much before April, from which time to the rains they will afford a delightful display of flowers. The Petunia likes a rich soil. On the hills sow in March in pans under glass, in a frame if possible, and only transplant once. Use rich soil and water frequently just before flowering.

Nicotiana.

TOBACCO.

N. Tabacum.—Bears pretty delicately-pink flowers. This and other species of Tobacco, though not usually met with in Indian gardens, are by no means wanting in ornamental character, and a plant or two well deserve a place there. Dr. Anderson gives the names of as many as sixteen species cultivated in the Botanical Gardens. Sow the seed in October. It is not worth cultivating in a garden on the hills, where space is limited.

Datura.

THORN APPLE.

Dhootura.

1. **D. alba.**—A common wayside weed, conspicuous for its large handsome white flowers, but inadmissible into the garden.

2. **D. fastuosa. fl. pl.**—HOSE-IN-HOSE.—Produces immense white blossoms, tinged with purple, remarkably handsome, and resembling in form three or four great extinguishers projecting one a little out of the other. Sow the seed in July on the plains, and in June on the hills.

3. **D. chlorantha fl. pl.**—Produces great handosme sweet-scented double yellow flowers. The plants will live on after flowering till the following season; but it is best to destroy them, as they take up much room and look unsightly, and to save the seed for sowing in July on the plains, and in June on the hills.

Hyoscyamus.

H. niger—HENBANE.—Bears large bell-formed, buff-coloured flowers, prettily pencilled with purple; an ornamental plant when in blossom, though rather unpleasant for its exceedingly rank smell. Sow in October on the plains, and in March on the hills.

Nicandra.

N. physaloides—ALKEKENGI—KITE-FLOWER.—An annual of large weedy growth; bears large pale sky-blue flowers of a cupped form, the bottom of the cup being white, and dotted with five dark spots. Sow the seed in common garden soil in October on the plains, and in March on the hills.

CONVOLVULACEÆ.

Convolvulus.

C. tricolor—CONVOLVULUS MINOR.—This beautiful and well-known trailing annual I have not found succeed at all satisfactorily in the vicinity of Calcutta: some seasons it will put forth a flower or two; but more commonly completes its growth and perishes on the approach of the hot season without having produced a single blossom. In the Upper Provinces, however, it succeeds to perfection. Sow in October in a light rich soil on the plains, and in March on the hills, where it comes to perfection, and is much used for rockeries.

Calonyction.

TRAVELLERS' MIDNIGHT LILIES.

1. **C. muricatun.**—A plant with thick succulent stems, of very luxuriant growth, and wide-spreading habit; bears large, handsome,

pale-purple, Convolvulus-like flowers, which only open after dark, and fade away shortly after dawn the next morning. Sow in October on the plains, and in March on the hills. The plants require a strong trellis for their support.

2. **C. grandiflorum**—MOON-FLOWER.—Similar in nearly all respects to the preceding, except that the flowers are of more expanded form, pure white, and fragrant.

Ipomœa.

1. **I rubro-cærulea.**—Native of Mexico; though of perennial duration, becomes worn out after one season, and therefore can be only cultivated successfully as an annual. A creeper of extensive growth, requiring a large trellis for its support: with fine dense foliage of large, smooth, heart-shaped, dark-green leaves; blossoms in the cold season, opening its large clear azure-blue flowers each morning early in countless numbers, and presenting then as splendid an object as the eye could possibly rest upon. The flowers fade in the after part of the day, turning first to a reddish tint. It is essential that the seed be sown quite as early as July for the plants to grow to perfection by the cold season; they do not require a rich soil, but a change of locality each year I have found to be all but indispensable to them. There is a variety with white flowers, but not nearly so beautiful.

2. **I. hederacea.**—A remarkably beautiful Ipomœa, bearing very large pale-blue flowers. By sowings in succession it may be had in blossom nearly all the year through.

8. **I. purpurea**—CONVOLVULUS MAJOR—MORNING GLORY.—Nothing imaginable can rival in beauty a patch of this familiar old creeper, producing each morning a profusion of flowers of every shade of colour, ranging from white through blue and crimson to dark purple.

On the hills all the above may be sown from March to May, in succession if necessary. The open ground is best suited to them, where they may be trained on pillars or trellis work.

Quamoclit.

1. **Q. vulgaris.**—BARBADOES SWEET-WILLIAM—CRIMSON CYPRESS-VINE. A very pretty creeper of slender growth; native of India; produces small vivid scarlet flowers, relieved beautifully by the finely-divided deep-green foliage. When trained up a pole the plant, as seen from the distance, has somewhat of the effect of a Cypress. Sow the seed about the middle of June, both on the hills and plains. There is a variety with white flowers.

2. Q. **Phœnicea.**—A pretty creeper, with small heart shaped leaves; produces pale red flowers of the size of a four-anna piece.

Sow the seed in the middle of June, both on the plains and on the hills.

Pharbitis.

GAYBINE.

1. P. **limbata.**—A native of Java; described in the seedman's catalogue as producing flowers with a "fine pointed star of intense violet-blue, with a broad margin of white." In the plants raised in my garden I have not found the white of the flower so pure and defined as one might from the description expect it to be, but the flowers are of wonderful beauty still. May be had nearly always in blossom by successive sowings. Put down seeds in June, both on the plains and on the hills.

2. P. **nil**—*Kâla Dânâ* of the natives; a creeper bearing a beautiful flower of the purest azure blue; a native of India. Its commonness as a weed alone excludes it from the garden. Sow in June on the plains and the hills.

POLEMONIACEÆ.

Phlox.

P. **Drummondi.**—A delightful annual, with numerous varieties bearing lovely trusses of flowers, varying through each shade of colour from white to scarlet, deep crimson, almost black, and rose colour; one of the indispensable ornaments of an Indian garden. English seedsmen now put up seeds in strains, comprising many varieties of colour, including selfs, blotched, striped, and with a light or dark eye in the centre of the flowers. Sow the seed in October in gumlahs, and when the plants are two inches high, put them out into the ground. They love a very rich soil, and look best in small beds by themselves. They come early into bloom, and continue in their beauty till the middle of May. Where the soil is left undisturbed, they come up again self-sown the following cold season; but Sir J. Paxton states, "they do not luxuriate long in the same soil." The self-sown plants should be carefully preserved, as, though not equal to those raised from seed fresh from Europe, they may supply their place, should the European seed, as is often the case, fail to germinate.

On the hills the seed may be sown so early as the beginning of March under shelter, successive sowings being made up to May, if necessary. As soon as the weather becomes a little warm, put out the seedlings in beds and borders, reserving the choicer kinds for pots.

If seed be sown in January on the plains, and the plants be kept in pots in the verandah, they will blossom very prettily there during the months of June and July. There is a perennial species, differing from the annual species in being of erect growth, and producing larger flowers in great variety. This can only be grown on the hills.

Collomia.

C. coccinea.—A rather dwarf annual: bears erect dense heads of small, vivid, metallic, pale-red flowers; but as produced in this country not very effective. Sow in October on the plains, where it blossoms in March. On the hills sow in March.

Gilia.

1. **G. tricolor.**—A dwarf annual: bears phlox-like trusses of numerous sparkling flowers of the size of a four-anna piece, pinkish, with dark spots; a charming plant.
2. **G. capitata**—A straggling plant, bearing little resemblance in any respect to the last; produces dense tuft-like heads of azure-blue flowers.
3. **G. Achilleæfolia.**—Bears dense heads of pink-coloured flowers. Sow all the above in October on the plains, and in March on the hills.

Leptosiphon.

A very pretty genus of dwarf annuals, remarkable for their fine foliage and trusses of blooms varying in colour from white and yellow, to rose, purple and violet. Sow the seed in pots, pans, or in the open border or beds, in October on the plains, and in March on the hills. They don't bear transplanting well, and it is therefore advisable to sow the seed where the plants are intended to bloom. The following are the best known varieties:—

L. Densiflorus.—Bears heads of large purplish blue flowers. **L. Androsaceus**, bears violet-crimson flowers. **L. Aureus**, bears orange coloured flowers. **L. Densiflorus Albus**, bears fine heads of white flowers. **L. Luteus**, bears heads of yellow flowers.

Ipomopsis.

I. Elegans.—A beautiful plant, closely allied to Gilia, but very difficult to cultivate. It has finely divided foliage, and is a beautiful object when in full bloom, with its bright scarlet flowers, which are produced in March and April. On the plains of Upper India, the best

time to sow is October, in light rich soil, and the plants protected from the cold after being shifted into pots where they are intended to remain, or they will perish. In Bengal the protection is hardly needed. Water must be given with great care; too much, and the plants will damp off. On the hills the seed should be sown in May, in pots or pans in a frame or green-house. The soil must be very light. When the leaves are properly developed, the seedlings should be transplanted into pots where they are intended to remain, and kept in a frame or green-house during the summer, and in the stove during the winter. On the approach of the following spring they should be re-potted into fresh soil, when they will bloom in great beauty.

HYDROPHYLLACEÆ.

Nemophila.

1. **N. insignis.**—A delightful little annual; the first introduced, and perhaps the prettiest of the species; bears numerous bright azure-blue flowers of the size of an eight-anna piece. It has thriven well and blossomed beautifully exposed to the full sun in Upper India; but to be cultivated to perfection it should be grown in a shady spot in a light rich soil of leaf mould, if obtainable; the roots should always be kept moist, and the collar of the plant always dry. In the vicinity of Calcutta I have found it best to reserve the larger portion of the seed of this annual till late in November before sowing, as it will not germinate readily till the cold weather is quite set in: much, if not the whole of the seed that is sown earlier, either in gumlahs or in the open ground, is almost sure to perish. On the hills sow in March in pots, pans, or the beds and borders, where they are intended to bloom, as they don't bear transplanting well.

2. **N. discoidalis.**—Bears small, dark-peuce, not very showy flowers. 3. **N. atomaria.**—Small white flowers, dotted all over; not very interesting. And 4. **N. maculata.**—Little inferior to N. insignis in beauty; rather large white flowers, with a purple blotch on each petal. There are also other varieties, but they are sub-varieties of the above, and vary slightly in colour.

Eutoca.

1. **Eu. viscida.**—A handsome annual; bears numerous bunches of crowded bright-blue moderate-sized flowers; said to thrive best in a poor gravelly soil, and that branches of it continue growing and flowering two or three weeks after being gathered.

2. **Eu. Wrangeliana.**—An annual of struggling untidy growth; produces crowded bunches of lavender-coloured, not very showy flowers. Both the above are well suited for rockeries. Sow in October on the plains, and in March on the hills.

Phacelia.

P. tanacetifolia.—An annual of remarkably beautifui foliage, somewhat resembling in manner of growth a very handsome Fern. The flowers, small blue, and of not much merit, are borne curiously upon a long curled-spike like that of the Heliotrope. If much wet is allowed to lie upon the collar of the stem, the plants are very apt to rot off, particularly when just about to blossom. Sow seed in October on the plains, and in March on the hills.

Whitlavia.

W. grandiflora.—An annual of recent introduction and of great beauty; thrives and blossoms well in our Indian gardens; bears numerous bright, pure-blue, small, bell-shaped flowers. There is a variety with white flowers.

W. gloxinioides.—Bears large gloxinia-like flowers, blotched blue and white.

Seed should be sown in October on the plains, and in March on the hills.

NOLANACEÆ.

Nolana.

1. **N. atriplicifolia.**—A trailing plant, with fleshy succulent stems and leaves, which, unless protected, are very apt to be devoured by sparrows wherever they abound; bears exceedingly beautiful large flowers, much like those of a Convolvulus minor, bright blue, yellow, and white; having a very pleasing effect on the stems as they hang down over the sides of the pot. Sow the seed of this, and the two following varieties, in October on the plains, and in March or April on the hills, where the plants are to remain, as they bear transplanting very ill.

2. **N. paradoxa.**—Bears flowers of a dull heavy pale-blue, not attractive in the border, but very beautiful when seen close, being delicately pencilled with dark lines.

3. **N. prostrata.**—Has pale-blue flowers with white centre, prettily marked with dark lines.

All the above are well suited for rockeries and hanging baskets.

BORAGINACEÆ.

Cerinthe.

HONEYWORT.

1. **C. retorta.**—An annual with unpleasant pale yellow-green, livid-looking foliage. Bears, drooping from under the axils of the leaves, bunches of tubular flowers, an inch long, of the thickness of a cedar pencil, one half deep purple, and the end half primrose colour.

2. **C. major.**—With flowers very similar to above, but not so bright. Sow in October on the plains, and in March on the hills.

Echium.

VIPER'S BUGLOSS.

Plants with disagreeable-looking foliage, attractive only for the bright blue of their flowers. There are several varieties, but are not much grown in Indian gardens. Sow in October on the plains, and in March on the hills.

Myosotis.

M. palustris—FORGET-ME-NOT.—Universally known and loved for its beautiful little gem-like blue flowers, with golden eye. A perennial plant; but will not survive the hot weather, and must therefore be cultivated as an annual. There are other varieties, *viz.*, **M. alpestris,** blue; **alpestris** *alba*, white; **M. azorica,** purple; **azorica alba,** white; **M. dissitiflora,** blue, rather large-flowered; **M. sylvatica aurea,** blue with yellow eye; very pretty.

They all luxuriate in moisture, and therefore should always have the pot in which they grow standing in a pan of water. Sow the seed in October on the plains, and in March on the hills, where it thrives to perfection without any care.

Borago.

B. officinalis—BORAGE.—A plant with very coarse, unpleasant-looking leaves; only attractive for the intense blue of its flowers. Sow in October on the plains, and in March on the hills, in the place where the plants are to remain, as they suffer greatly from transplanting.

LABIATEÆ.

Perilla.

P. Nankinensis.—Bears insignificant flowers, but is much used as a bedding plant for its bronze-red-coloured leaves, which have a fine effect when mixed with Pyrethrum in edgings and borders. Sow the seed in October on the plains, and in March on the hills.

Salvia.

A very pretty genus; when well cultivated have a fine effect, especially planted in masses in beds. Sow the seed in October on the plains, and in March on the hills. Transplant into light rich soil when about three inches high. The best known varieties are :—

S. patens.—Bears lovely deep-blue flowers.

S. rubescens.—A new variety, producing spikes of dark reddish purple flowers, the lower lip being white.

Dracocephalum.

D. Moldavicum.—An unpretending annual, bears small blue and white flowers. To be at all effective the plants must be grown crowded in patches. Sow in October on the plains, and in March on the hills.

VERBENACEÆ.

Verbena.

One of the most attractive of our cold-weather annuals. Though a perennial, it is always cultivated as an annual in this country, at any rate on the plains. The Verbena loves a light rich soil, particularly leaf mould. The seed should be sown in October on the plains, and in March on the hills, in pans. When the fourth leaf has properly developed, the seedlings should be transplanted into the places where they are intended to bloom. Water should be given with care, as they are very susceptible to damp, and too much moisture will kill them, or render them "leggy" and scraggy-looking.

The Verbena has been brought to great perfection recently by hybridization, and English seedsmen send out seeds in what they call "Strains." The best of these are the large-flowered, the auriculœflora,

the new Mammoth, and the carnation-striped. Seeds should be procured from a reliable and respectable seedsman.

PEDALIACEÆ.

Martynia.

1. **M. diandra.**—A native of Mexico, but naturalised in this country; bears in great profusion very large, handsome, gape-mouthed, rose-coloured flowers, of a heavy, rather disagreeable odour; grows to between three or four feet high, and forms quite a little bush, with large coarse leaves, of such rampant growth as hardly to be admissible in a garden but of large extent. The seeds are sown in July on the plains, and in May on the hills, and the plants continue in blossom during the rains. The seed-pods are very curious, being about the size of an Almond, black, with two long horns proceeding from one end, of so hard, horny a nature that the seeds can only be removed with great difficulty; it is best, therefore, to sow the seed-pod entire, and separate the young seedlings afterwards.

2. **M. fragrans.**—Bears flowers very similar to those of the preceding, and of the same rank, unpleasant odour, but is a plant of much smaller habit, with much smaller foliage. Sir J. Paxton gives some very particular directions for the cultivation of this annual in England,* but here nothing more is required than to sow the seed in well-enriched soil in October on the plains, and in April on the hills, and about seven weeks after the young plants will come into flower, and continue blossoming and growing till about two feet high.

3. **M. Lutea.**—A plant in every respect similar to the last, except in bearing pale yellow flowers.

It may be noted here that on the hills it is useless to cultivate these plants unless under glazed shelter.

Sesamum.

S. Indicum—*Til.*—A native of this country, and grown in great quantities for the sake of the seed, from which an oil is extracted; but still a pretty annual, bearing large, tubular, white, and rose-coloured flowers, and well deserving a place in the garden. Sow the seeds in July. It is not worth a place in hill gardens, where space is limited.

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* 'Magazine of Botany,' vol. i, p. 118.

GESNERACEÆ.

Klugia.

K. Notoniana.—A native of Ceylon and abundant in the Nilgherries; a small plant remarkable for the curious snail-like twist of its leaves, and the bright smalt-blue of its small flowers. Blossoms in the cold season, and loves a moist soil. Sow the seed in October on the plains, and in April on the hills, and keep the pots in pans of water after the seedlings are transplanted.

ACANTHACEÆ.

Thunbergia.

T. alata.—A very beautiful small climbing annual, naturalised in this country; bears round, flat flowers of moderate size, and of a great variety of shades of colour, white, yellow, buff, and orange, with and without a dark purple eye. Sow the seed in October on the plains, and in March on the hills. Some attention should be given to the gathering of the seed-pods, otherwise when quite ripe they fly open suddenly, and the seed becomes lost. It is well suited for rockeries, or training over trellis work.

SCROPHULARIACEÆ.

Browallia.

B. elata.—A small annual of upright growth, comes into blossom seven or eight weeks from the time of sowing, and produces a profusion of small bright-blue flowers, which last a very long time. To be effective several plants must be grown together in a group. Sow the seed in October on the plains, and in March on the hills.

Salpiglossis.

S. sinuata.—A tall, erect-growing annual, of exquisite beauty when in full blossom, with its numerous delicately-pencilled velvety flowers, of the size and form of a thimble, and of various shades of colour. Sir J. Paxton says it is a native of Chili, "where it grows on dry clay banks, which are baked by the sun till they are little less hard than flints."* Sow the seed in October on the plains, and in

* 'Flower Garden,' vol. ii, p. 167.

March on the hills, and prick out the plants when about an inch or so high to the places where they are to remain. They come into blossom very late, but thrive well in the border, and continue to flower on the plains till the rains set in and destroy them. On the hills they bloom till November almost.

Schizanthus.

Annuals of rather straggling, untidy habit, but very pretty when in full blossom, with their numberless, curiously-formed, somewhat small flowers of various colours.

Sow in October on the plains, and in March on the hills, in a light, rich, sandy soil, where the plants are to remain, as they cannot stand transplanting well.

Calceolaria.

VENUS'S PURSE.—This annual has been brought to great perfection at home by hybridization; various 'Strains' are offered by the several English seedsmen. It is now regarded as a 'Florist's flower,' and is cultivated as such. The flowers resemble circular purses, and have a very fine effect when properly grown. The seed should be sown in light-soil, in October on the plains, and about the beginning of March on the hills. When the seedlings have formed the fourth leaf, they should be pricked off into pots where they are to remain, the soil being a light and rich one, with plenty of leaf mould and sand. On the hills they come to great perfection without much trouble. On the plains I have seldom known them to grow to satisfaction. The common yellow variety, **C. pinnata**, thrives well enough, and is the one generally met with on the plains.

What are known as the 'Shrubby' and 'Herbaceous' varieties, which can only be cultivated on the hills, produce brilliant coloured flowers of many shades, and form a conspicuous feature in a collection of potted annuals.

Verbascum.

MULLEIN.

Erect, high-growing, coarse, weedy-looking plants, producing numerous yellow flowers of moderate size, of little ornament to the garden. Sow the seed in October on the plains, and in March on the hills.

Alonsoa.

A. incisifolia.—MASK-FLOWER.—A small, not very attractive plant, with ragged leaves; produces small, vivid-scarlet flowers. Should be grown in large patches. Sow in October on the plains, and in March on the hills.

Nemesia.

N. floribunda.—A dwarf annual, bearing small flowers differing in no marked degree from those of Linaria. Sow in October on the plains, and in March on the hills.

Linaria.

TOAD-FLAX.

Several species; bearing pretty, unpretending, small frog-mouthed flowers in vast profusion. Sow in October on the plains, and in March on the hills. To be effective several plants should be grown together in a group.

Antirrhinum.

A. majus.—SNAPDRAGON.—A perennial by nature, but usually cultivated as an annual in this country; the seed is sown in October on the plains, and in March on the hills. They want a rich soil to grow them to perfection. The genus comprises a vast number of most beautiful varieties, which blossom often the same season that the seed is sown, but more beautifully, as it appeared to me, when kept over till the following cold season, at the commencement of which they should be taken up and planted in fresh soil, well enriched.

Collinsia.

C. bicolor.—An annual of loose, untidy habit, about a foot-and-a-half high, rather pretty and effective in the border when in full blossom, with its profusion of blue and white flowers borne in a succession of whorls up the stem. Sow the seed in October on the plains, where it will be in flower by the end of January. On the hills the seed should be sown in March.

Chænostoma.

C. polyanthum.—Bears small, insignificant pink flowers; scarcely worthy of a place in the garden. Sow the seed in October on the plains, and in March on the hills.

Mimulus.

M. speciosus—MONKEY-FLOWER.—A plant of prostrate growth; bears large, handsome, gape-mouthed, orange-crimson flowers, with several varieties: **Maculosus**, tiger-spotted or golden-yellow blotched with chestnut-colour; one white spotted with crimson; and **duplex**, one with double or hose-in-hose flowers. There are others known as **Cardinalis, Cupreus, Neuberte, Tigridioides**, and **Tilingi**, which bear scarlet and copper-coloured flowers. These never should be omitted from a collection of annuals in an Indian garden. The seed is very minute, and the best way to sow it is to mix it first largely with pure silver-sand, and then cast pinches of the mixture upon broad pans filled with a light soil, in which sand is an abundant ingredient. The seed-pans should not be watered from above, but be put, when the soil in them is becoming dry, into larger pans filled with water, until the whole earth has become moistened by the water passing through the holes below. Prick out the seedlings, when large enough, into single pots; they are benefited by frequent repotting. They require a rich soil, in which a large proportion of silver-sand is incorporated. The plants are all but aquatics, and do best with the pots in which they grow, kept continually standing in pan-feeders. Sow the seed in October on the plains, and in March on the hills.

CAMPANULACEÆ.

Specularia.

1. **S. Speculum**—VENUS'S LOOKING-GLASS.—An old, familiar dwarf annual; bears small purplish-blue flowers in great profusion, which remain long in bloom; for effect, requires to be grown in masses. 2. **S. pentagonia** bears similar, but larger, flowers; and **Campanula Loreyi** is also very similar. Sow in October on the plains, and in March on the hills.

LOBELIACEÆ.

Clintonia.

C. pulchella.—A dwarf annual, suited only for growing in pots; bears little dazzling, gem-like blue flowers, with yellow and white eye; a truly lovely object when in full perfection of bloom. The seeds are exceedingly small, and to distribute them more evenly it is best to mix them in silver-sand, and throw the mixture pinch by pinch over the

soil. Sow in October on the plains, and in March on the hills. The following is the substance of the directions given by Sir J. Paxton :—

"Sow thinly in light sandy soil, as thick sowing is very injurious. Shift continually. Plant three in a pot, the soil of which is comprised of leaf-mould, sand, and well-decomposed manure. In proportion to the richness of the soil the larger the flowers and the finer the bloom. Well stop by pinching off the tops; and they will flower in a manner altogether surpassing belief."*

They require abundance of water, and are best kept with the pots standing in water. In the vicinity of Calcutta I have met but with little success in the cultivation of this annual, but in Upper India and on the hills, it comes to perfection.

Lobelia.

Lovely little pot-annuals; continue in blossom a great length of time; thrive well in India, cultivated in the same way precisely as directed for Clintonia.

1. **L. speciosa.**—Bears small flowers of intense smalt-blue with a bright white spot.

2. **L. ramosa.**—Bears larger flowers, but of not so brilliant a blue; the variety of this with so-called red, but in reality pale dull, reddish-white flowers, has little beauty to recommend it. There are other varieties such as **Erinus, Pumila,** and **Compacta,** bearing blue and white flowers; while a new variety from Mexico, **Cavanillesi,** is an erect growing plant, bearing brilliant scarlet flowers.

VALERIANACEÆ.

Centranthus.

C. macrosiphon—RED VALERIAN.—A plant about two feet high, with ovate, much-toothed leaves; bears large, dense heads of small pale-red flowers: a showy annual. Sow in October on the plains, and in March on the hills; and put out the plants in the border when two or three inches high.

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* 'Magazine of Botany,' vol. iv, p. 146.

DIPSACEÆ.

Scabiosa.

S. atropurpurea—SCABIOUS—DEVIL'S BIT.—Bears large, handsome, globose heads of dark-purple blossoms. Sow in October on the plains, and in March on the hills; the plants will not always flower the same season, but if kept over till the following cold season will blossom early then. A variety has been produced with scarlet flowers.

ASTERACEÆ.

Ageratum.

A. Mexicanum.—An exceedingly handsome plant when in the full height of bloom in the cold weather on the plains, and bearing its numberless small tassel-like flowers of a very pure, pale-lavender colour. Sow the seed in August to October on the plains, and in March on the hills; and prick out the young plants into pots, one in each; in October transfer them to the open ground, only one in one spot, as they are very extensively growing plants.

Callistephus.

C. hortensis—CHINESE OR GERMAN ASTER.—Comprises several distinct varieties, such as—Globe, Hedgehog or Needle, Bouquet, and Perfection, with its several varieties, perhaps the most beautiful. These are of nearly every colour, and nothing can surpass in beauty a group of them in full bloom. But to have really fine flowers, it is essential to procure the German-imported seed, and not English-grown. The seed should be sown early as September on the plains, and the young plants pricked out to two inches apart, and afterwards potted off singly into small pots, shifted from time to time to larger ones, with a very rich soil, and watered occasionally with liquid manure. Some will come into blossom in January, and others later in succession. On the hills sow early in March, and treat in the same way. They blossom until the end of November in the open.

Brachycome.

B. iberidifolia—SWAN RIVER DAISY.—A dwarf plant, with finely divided foliage, presents a most cheerful appearance when in full bloom with its single daisy-like blue and white flowers, which it produces in

great profusion. Sow in October on the plains, and in March on the hills, and put out in the border the young plants, three in a spot, a foot apart.

Zinnia.

1. **Z. elegans.**—A most beautiful and valuable annual, with varieties bearing severally large gay crimson, scarlet, and strawcoloured flowers, and forming quite a garden of themselves for a very long season. The double variety appears to have originated in this country. There is also sometimes met with what is called a hen-and-chicken variety. The seed should be sown in pots in the middle of June, both on the plains and on the hills, and the young plants put out in the borders by threes; they soon come into blossom. Those of the double variety give poor flowers at first, but as the season advances, the plants keep on growing and flowering, till they are two or three feet high, and produce flowers then nearly as large as those of the Dahlia, retaining their full beauty a great length of time. In a spot where once grown Zinnia plants are sure to come up self-sown the following season.

2. **Z. pauciflora.**—A tall-growing plant; produces flowers very inferior to those of the last; not very ornamental. **Z. Darwinii,** bearing conical shaped flowers, of various shades. **Z. Pumila Fl. Pl.** of dwarf compact habit. **Z. Haagiana, Fl. Pl.** bears brilliant orange scarlet flowers. These are all the newest novelties.

Calliopsis.

1. **C. tinctoria.**—An old familiar annual, with many beautiful varieties, of which those with deep chestnut-coloured and golden-yellow flowers look exceedingly splendid intermixed; requires no particular care in its cultivation. Sow the seed in October on the plains, and in March on the hills, and put out the plants in the border when two or three inches high. It comes into bloom in March on the plains, and by carefully removing the seed-vessels as they form, may be had in flower continually all the hot season.

2. **C. filifolia,** *var.* **Burridgii.**—A species with finely-divided foliage, bears very handsome flowers with brilliant golden-yellow rays, and large centre of rich crimson-maroon. Treatment same as the preceding.

Helianthus.

H. annuus—SUNFLOWER—*Soorujmookhee.*—This well-known annual thrives well in India; the varieties **grandiflorus-plenissimus** and **Californicus** are remarkable, the first for its enormous flowers, the

second for its exceedingly double ones. Some species are distinguished for their silvery foliage: as **argenteus, argyrophyllus,** and **Texanus hybridus**: one **macrophyllus** is described as having large handsome deep green leaves; and **uniflorus** as being most gigantic of all, growing to ten feet high. The seeds should be sown in July, both on the plains and on the hills. The plants require no particular treatment, and no care beyond attaching stakes to the tall-growing plants to prevent them being blown down and uprooted.

Cosmos.

C. bipinnatus.—Bears pretty pink, daisy-like flowers on stems two feet high. Sow in October on the plains, and in March on the hills, and plant out in the border in a rich soil.

Spilanthes.

S. oleracea.—An interesting dwarf plant with rich green leaves; bears numerous curious yellow button-like flowers, with dark-brown tops; very pretty either in pots or in the border. Sow the seed in July on the plains. It does not thrive well on the hills unless grown under glass.

Ximenesia.

X. encelioides.—A weedy-looking plant with bright yellow dandelion-like flowers of not much beauty. Sow in October on the plains, and in March on the hills.

Sanvitalia.

S. procumbens.—A prostrate-growing plant, covering the ground with its small oval leaves, from among which sparkle its daisy-like flowers, with golden rays and deep puce-coloured eye. Sow in October on the plains, and in March on the hills. No particular care required in its cultivation. Ordinary garden soil will suit it.

Tagetes.

1. T. erecta—AFRICAN MARYGOLD—*Gainda.*—Well known for its handsome, showy yellow flowers, held in universal esteem by the natives of India; there are several varieties, some with flowers as large and as double as ordinary-sized Dahlias. Sow the seed in August on the plains, and the plants will be in blossom all the cold season. On the hills sow in June.

2. **T. patula**—FRENCH MARYGOLD.—A much dwarfed plant, with comparatively small flowers; the seed may be sown at nearly any season; the plants, where once grown, continually reproduce themselves by self-sown seed. There are two or three other varieties, known as **T. Pumila** and **Africana**, being very dwarf plants, and bearing small flowers, yellow blotched with chocolate, the seed of which should be sown in October on the plains, and in March on the hills.

Callichroa.

C. platyglossa.—Bears large yellow flowers, with dark purple eyes, much like those of Calliopsis. Sow in October on the plains, and in March on the hills.

Sphenogyne.

S. speciosa.—A very beautiful annual, with finely-cut, graceful foliage; bears flowers like those of a single Marygold, with pale straw-coloured rays, contrasting vividly with the large, shining black centre. Sow the seed in October on the plains, and in March on the hills, in good soil, and put out the plants by threes in the border a foot apart. I have cultivated this annual with success in the Upper Provinces, but not so in Bengal.

Madia.

M. elegans.—A coarse-growing plant, with large, woolly leaves; bears numerous largish, daisy-formed, white flowers, with a brown ring round the base of the rays. Sow in October on the plains, and in March on the hills.

Cladanthus.

C. Arabicus.—ARABIAN CHAMOMILE.—Produces small flowers bearing some resemblance to those of Chamomile. Sow in October on the plains, and in March on the hills.

Chrysanthemum.

C. carinatum.—With its two or three varieties, one of the most showy annuals of the garden; bears daisy-like flowers as large as a watch, with white or yellow rays and dark-brown eye. The seed is sown in October on the plains, and in March on the hills, and the young plants are put out by threes, a foot apart, in good enriched soil in the border.

The newer varieties are **C. Carinatum aureum**, with golden leaves; **C. Coronarium**, with very double lemon-coloured flowers; **C. Japonicum**, having several varieties of tall growth; **C. Segetum grandiflorum**, bearing large sulphur-yellow flowers two inches in diameter. These are all desirable varieties to cultivate.

Rhodanthe.

1. **R. Manglesii.**—A very lovely little pot-plant deserving all possible care that can be bestowed in the cultivation of it; bears numerous small, delicate looking, rose-coloured, everlasting flowers. It has been observed that "few plants brought to Covent Garden Market charm the visitor so much as the silvery rose-tinted flowers of the Rhodanthe." Sow the seed in October on the plains, and in March on the hills, in a light leaf-mould soil, and prick out the plants into small pots. Shift several times as the plants increase in size, using at the last decayed manure abundantly. All cultivators insist on the great advantage of frequent shiftings of this plant. To me, however, the plants appear far more effective when several are grown in one pot or pan. 2. **R. maculata** is a more robust species with dark ring round the disk. **R. Maculata flore plena** is a double variety of the same, bearing rosy-carmine flowers. **R. Atrosanguinea** bears dark crimson flowers. **Podolepis gracilis.**—In all respects very like **R. Maculata**, and bears pale Lilac flowers.

Acroclinium.

A. roseum and **album.**—Bear dry or everlasting flowers very similar to those of the preceding, but very much larger; growing to about three feet high, and is a very ornamental object when in full bloom, as it usually is on the plains, by the beginning of February. Sow the seeds in October on the plains, and in March on the hills, and put out the plants in the border in a good soil.

Helichrysum.

EVERLASTINGS.

Curious for the rather large, dry, husky flowers they bear, but of no very ornamental character in the garden. The flowers remain unchanged for many months, and are often used as an indoor ornament. The plants grow to two or three feet high, and require no particular care in their cultivation. There are varieties with white, yellow, and rose-coloured flowers. Sow in October on the plains, and in March on the hills.

Cineraria.

A beautiful genus of plants, having a great variety of colours. By nature a perennial, but can only be grown as such on the hills, where it comes to great perfection. Here the seed should be sown early in March in a green-house under shelter of some kind. Prick off the plants as soon as they attain the fourth leaf into small sixties. When they have made more growth, shift them again into pots, three in each, where they are to remain, using light rich soil. Keep them protected from the strong rays of the sun during the month of June, and they will bloom in great beauty.

At home the Cineraria is cultivated as a 'Florist's Flower,' and English seedsmen supply seeds in 'Strains.'

On the plains of India they don't come to such perfection; they are nevertheless very delightful ornaments of the garden during the cold months. Sow the seed about the middle of September, and treat in the same way as recommended for the hills. Protection from the strong rays of the sun is absolutely necessary to secure success.

C. acanthifolia.—This is an annual of comparatively recent introduction. It is remarkable chiefly for its finely cut silvery foliage; and being of dwarf growth, is much used for edgings to borders and beds.

C. maritima.—Very similar to the foregoing, only handsomer, and more compact of growth. The leaves are of a beautiful silvery hue. Neither of these two are cultivated for their flowers, which are yellow and insignificant.

Seeds of both the foregoing should be sown with the flowering varieties, and when the seedlings are two or three inches high, should be planted out in the beds and borders where they are to remain. They don't require much watering.

Cacalia.

C. coccinea—TASSEL FLOWER.—Bears pretty, small, scarlet, tassel-like flowers; a very common plant in Indian gardens, where it reproduces itself like a weed by the seed it casts about. Always in blossom. Sow in October on the plains, and in March on the hills.

Senecio.

S. elegans—JACOBÆA.—A rather straggling and untidy annual, but very handsome when in full blossom, with its numerous large heads of groundsel-like flowers of great brilliancy and variety of colour. In the Upper Provinces I have had it blossom freely enough, but in the neighbourhood of Calcutta the plants I have raised have for the most

part only completed their growth, but to perish on the approach of the hot season without having produced a single flower. On the hills they come to great perfection. Sow in October on the plains, and in March on the hills; the plants require a good soil, and do best in the open border.

Calendula.

C. officinalis—MARYGOLD.—This old familiar plant of English gardens should not be omitted from among our winter annuals. It may be had of many varieties of colour from pale straw to deep orange, single and double. If the seed to be sown is from Europe, it had better not be put in the ground till the cold season is quite set in, otherwise the young plants raised under cover are almost sure to damp off and perish; it is also a most difficult plant to transplant without injury. It is best therefore to sow the seed in the border where the plants are to remain. It does not require very rich soil, and when full grown rejoices in the full blaze of the sun. As English seed cannot be depended upon always to germinate, it is well, where plants have once been raised, to save seed for a future season. To do this, as soon as the flowers have dropped and the seed-heads formed, cover them over with a small piece of muslin and tie round the stalk, otherwise the seeds on ripening will drop and be lost. Sow about the beginning of November on the plains, and in March on the hills.

Venidium.

V. calendulaceum.—A plant of low growth, with large, coarse, weedy-looking foliage; produces flowers which might be easily mistaken for those of the Marygold. Sow in October on the plains, and in March on the hills, and put out the plants singly in the border.

Centaurea.

1. **C. moschata**—SWEET SULTAN.—A well-known old annual; bears heads of thistle-like purple flowers, showy but of no great beauty. 2. **C. suaveolens**—YELLOW SULTAN.—Bears yellow sow-thistlelike flowers. 3. **C. Cyanus**—CORN-BLUEBOTTLE.—A common weed in England, as it has almost become in gardens in India; pretty when grown in patches for the pure azure-blue of its flowers.. 4. **C. Americana.**—A tall growing plant; bears very large heads of Lilac flowers. The seeds of all the species should be sown in October on the plains, and in March on the hills, and the plants put out in the border in rich soil.

C. Candidissima.—This is quite a distinct variety, being grown only for the sake of its foliage, which is finely cut, and of a silvery hue, and therefore well suited for ribbon borders, edgings, or bedding purposes. This, and the following, are comparatively recent introductions:—**C. Clementei,** has very handsome foliage, completely covered with snow-white down. **C. Gymnocarpa,** is the most graceful of all, having silvery white leaves. All of the above are of dwarf growth. The seed should be sown in October on the plains, and in March on the hills. When the seedlings are two or three inches high, they should be planted where they are to remain. A gravelly soil, with lime, suits them best. They don't need much water.

Carthamus.

C. tinctorius—SAFFLOWER—*Koosoom.*—Though an agricultural plant, this may be admitted to a place in the garden for the numerous showy yellow flowers it produces. Sow in July on the plains. It is not worth growing on the hills

Tolpis.

T. barbata—BEARDED HAWKWEED.—Rather a bright and showy little annual; bears large yellow and white daisy-like flowers. Sow in October on the plains, and in March on the hills.

Kaulfussia.

K. amelloides.—A small annual; bears very pretty daisy-like flowers of two colours, blue and white. There are varieties bearing rose-coloured and dark violet flowers also. Sow in October on the plains, and in March on the hills, and put out the plants by threes, when about two inches high, in good soil in the border.

ONAGRACEÆ.

Œnothera.

EVENING-PRIMROSE.

1. **Œ. tetraptera.**—A plant of prostrate growth, pleasing for the profusion of large white blossoms it opens in the evening. Sow the seed in October on the plains, and in March on the hills, it reproduces itself by dropping its seed.

2. **Œ. bistorta.**—A weedy plant; bears small, yellow flowers.
3. **Œ. bistorta veitchiana.**—Bears yellow flowers with crimson spots.
4. **Œ. Drummondi-Nana.**—Bears large bright yellow flowers; and
5. **Œ. Rose.**—Bears rose-coloured flowers.

Godetia.

Very beautiful annuals, producing flowers of the size of a rupee, of every shade of blush and rose-colour, with a dark stain on each petal. Sow in October on the plains, and in March on the hills. To be effective, they are best grown in clumps. They comprise **G. Lindleyana,** of which there is a double variety; **G. rubicunda,** of which the variety "Bride" is eminently chaste and pretty; and **G. roseo-alba, G. Whitneyi,** blush and crimson; **G. Duchess of Albany,** beautiful large white flowers, four inches across; and **G. Lady Albemarle.** carmine flowers.

Clarkia.

1. **C. elegans.**—An annual in very general cultivation, of sprawling, untidy habit, but ornamental when in full blossom with its pretty fringe-like pink flowers. In the vicinity of Calcutta I have never seen it blossom satisfactorily. There is a variety with white and one with double flowers. Sow in October on the plains, and in March on the hills, in good soil.
2. **C. pulchella.**—A much smaller and neater plant than the last, and produces a prettier flower. There are varieties with pink and white flowers; a double one also, and one with the petals unnotched.

Eucharidium.

Eu. concinnum.—A pretty, unpretending plant; bears pink flowers very similar to those of Clarkia. Sow in October on the plains, and in March on the hills.

Gaura.

G. Lindheimeri.—When first in blossom, a very pretty annual bearing spikes of rather large milk-white flowers; on becoming older, the plant loses much of its beauty by the spikes becoming longer and the flowers more scattered upon it. Sow in October on the plains, and in March on the hills, and plant out in the border in good soil.

LOASACEÆ.

Bartonia.

B. aurea—GOLDEN BARTONIA.—A very beautiful annual, opening its large, yellow, buttercup-like flowers in a situation where fully exposed to the sunshine. It requires a very rich soil and abundance of water, in the administering of which caution must be taken that too much moisture do not lie round the collar of the stem, or the plants are very apt to rot off just when about coming into bloom. Sow the seed in October on the plains, and in March on the hills, and put out the plants in the border when two inches high.

Loasa.

Creepers; having leaves which, when touched, sting like nettles; the flowers they bear are rather curious than very beautiful.

1. **L. aurantiaca.**—Bears orange-coloured flowers.
2. **L. nitida.**—Bears yellow and red flowers. Sow the seed in October on the plains, and in March on the hills.

APIACEÆ.

Didiscus.

D. cæruleus.—Singular as being the only annual of the vast number of plants this order contains, that is of an ornamental character; bears umbels of beautiful azure flowers, flat at first, and becoming semi-spherical afterwards. Sow the seed in October on the plains, and in March on the hills, and put out the plants when two inches high in a good soil in the border. If grown in pots, it is benefited by frequent shiftings; blossoms in April on the plains.

ORNAMENTAL TREES, SHRUBS, AND HERBACEOUS PERENNIALS.

PART IV

THE FLOWER GARDEN.

ORNAMENTAL TREES, SHRUBS, AND HERBACEOUS PERENNIALS.

THE plants described here comprise, it is believed, nearly all with any pretensions to an ornamental character, and of which we have any knowledge as being found in Indian Gardens. It will, however, be seen that a considerable proportion of these are only to be met with in the Calcutta and other Botanical Gardens, and among the collections offered for sale by the two or three important nurserymen and plant-merchants of Calcutta. The reasons for this are obvious. In large public gardens and private nurseries, facilities exist for importing and otherwise obtaining new and rare plants which private individuals do not possess; while in the way of plant-houses and other structures used for growing plants in, the gardens above mentioned possess advantages which are necessarily beyond the resources of amateurs as a rule. Nevertheless, it has been considered advisable to include here all plants, as near as may be, now in cultivation, as in a work professing to deal with gardening, such as this, it would render it less complete not to include them.

The cultivation, propagation and general treatment adapted for the choicer and rarer kinds, as well as the more common favourites, have been given, as a rule, at length, for the plains, and in somewhat less detail for the hills; but in reference to such as are so common and hardy as to be met with in an indigenous state, they are dealt with more or less summarily.

Opportunity has been taken to give lists of plants for the convenience of those who wish to make a selection for any of the purposes specified at the heading of each. These plants will be found fully described in their proper places. It is to be understood, however, that when a generic name only is given, as for example, in the case of Begonia, Bletia, &c., more than one of the species are suited for the purpose. The lists are necessarily limited, but they have been made so purposely.

THE FLOWER GARDEN.

1. Plants suited to be grown in pots to decorate the verandah :—

Abutilon Bedfordianum. 444
Aloysia citriodora. 553
Arum pictum. 351
Asystasia formosa. 571
Begonia.
Bletia.
Chrysanthemum.
Cissus.
Caladium.
Croton.
Euphorbia jacquiniflora.
Eucharis amazonica.
Ferns.
Franciscea.
Fuchsias.
Geranium.
Gesnera Douglasi.
Habrothamnus fasciculatus.
Hoya.
Hydrangea.
Jatropha panduræfolia.
Jasminum.
Lemonia spectabilis.
Olea fragrans.
Orchids.
Palms.
Pentas carnea.
Rondeletia punicea.
Roses.
Salvia splendens.
Solanum argenteum.
Talauma pumila.
Tetranema Mexicana.
Torenia.
Verbena.

2. Bulbous and Tuberous-rooted Plants suitable for pots :—

Anemone. 453
Achimenes. 560
Amaryllis. 367
Arum pictum. 351
Begonia.
Caladium.
Cipura.
Crinum.
Crocus.
Cyclamen.
Dahlia.
Eucharis Amazonica.
Funkia subcordata.
Gladiolus.
Gloxinia.
Gesnera.
Hippeastrum.
Hyacinth.
Iris.
Ixia.
Jonquil.
Lilium longifolium.
Maranta.
Narcissus.
Oxalis.
Pancratium.
Ranunculus.
Richardia Ethiopica.
Sparaxis.
Spiræas.

3. Climbing Plants suitable for pots :—

Asparagus plumosus & nanus.
Æschynanthus. 563
Cissus.
Clerodendron splendens.
Clitoria. 476
Cobæa scandens.
Hoya.
Lophospermum scandens.
Manettia cordifolia.
Maurandya.
Meyenia Hawtayneana.
Passiflora.
Stephanotis floribunda.
Thunbergia.

4. Scandent and Twining Shrubs :— 131, 411

Abrus precatorius. 478
Akebia quinata. 429
Allamanda. 521
Aniseia media. 539
Argyreia splendens. 541
Aristolochia.
Asparagus racemosus.
Banisteria laurifolia.
Batatas paniculata.
Bauhinia.
Beaumontia grandiflora.
Bignonia.
Bugainvillea.
Centrosema Plumieri.
Cereus nyctocallus.
Clitoria.
Cobæa scandens.
Combretum.

Congea azurea.
Convolvulus pentanthes.
Cryptostegia grandiflora.
Dalbergia.
Dipladenia.
Echites.
Gloriosa superba.
Henfreya scandens.
Hexacentris coccinea.
Hiptage madablota.
Ipomœa.
Jasminum.
Lonicera.
Melodinus monogynus.
Murucuja ocellata.
Pæderia fœtida.
Parsonsia corymbosa.
Passiflora.
Pentalinon suberectum.
Pergularia odoratissima.
Petræa Stapelia.
Poivrea coccinea.
Porana paniculata.
Quisqualis Indica.
Rhyncospermum jasminoides.
Roupellia grata.
Rivea bona nox.
Securidaca.
Spathodea uncinata.
Stephanotis floribunda.
Tecoma.
Thunbergia.
Wistaria Sinensis.

5. Plants remarkable for the fragrance of their leaves :—

Aloysia citriodora.
Andropogon Martini.
Artemisia Abrotanum.
Cinnamonum.
Citrus.
Clausena heptaphylla.
Crossastephium Artemisioides.
Dracocephalum Canariense.
Lantana.
Geranium, lemon and rose-scented.
Lasandula Specata.
Lemonia Spectabilis.
Myrtus Communis.
Ocimum.
Pimenta vulgaris.
Plectranthus aromaticus.
Pogostemon.
Ruta.
Vitex.

6. Trees and shrubs remarkable for the strong fragrance of their blossoms :—

Acacia.
Aglaia odorata.
Artabotrys odoratissimus.
Artemisia lactifolia.
Cœsalpinia coriaria.
Chimonanthus fragrans.
Citrus.
Clerodendron fragrans.
Dalbergia sisso.
Dombeya.
Eupatorium odoratum.
Franciscea.
Gardenia.
Hamiltonia.
Hedychium.
Heliotropium.
Hoya.
Ixora.
Jasminum.
Jonesia Asoka.
Lawsonia alba.
Lonicera.
Magnolia.
Mesua ferrea.
Michelia champaca.
Micromelum integerimum.
Millingtonia hortensis.
Mimusops elengi.
Murraya exotica.
Nerium.
Nyctanthes arbor-tristes.
Olea fragrans.
Pandanus odoratissimus.
Pergularia odoratissima.
Photenia dubia.
Plumieria.
Polyanthes tuberosa.
Portlandia grandiflora.
Rhyncospermam jasminoides.
Rosa.
Stylocoryne Weberi.
Talauma Pumila.

7. Trees and Shrubs of Ornamental foliage :—

Anthurium.	Dieffenbachia.	Nandina domestica.
Aralia.	Dioscorea.	Nepenthes.
Acæna.	Dacrydium.	Panax.
Acalypha.	Dracæna.	Palms.
Alocasia.	Echites picta.	Pavetta diversifolia.
Araucaria.	Elæagnus.	Pellionia.
Asparagus.	Eranthemum.	Peperomia.
Caladium.	Exæcaria.	Pisonia.
Callistemon.	Filicium decipiens.	Pittosporum.
Celastrus scandens.	Gesneria refulgens.	Poinsettia.
Cissus.	Grevillea robusta.	Podocarpus.
Coleus.	Graptophyllum.	Pothos.
Croton.	Heliconia.	Pterospermum.
Curmeria Wallisii.	Hibiscus Zebrina.	Ruellia maculata.
Cupressus.	Juniperus.	Thuja.
Cyanophylium magnificum.	Lourea vespertilionis.	Schismatoglottis.
	Maranta.	Urtica.
Chamæcladon rubens.	Mimosa brevipenna.	Xylophylla.

LYCOPODIACEÆ.

Lycopodium.

CLUB MOSSES.

A genus of plants possessing great delicacy and beauty, some having much of the aspect of ferns, while others, as the name denotes, are of a club-like form with imbricating leaves, some erect and some drooping prettily in the manner of a watch-guard. They are not very easy of cultivation on the plains of upper India, unless kept in a moist and shady grass-conservatory, or in a glazed fern case. In lower Bengal, however, and places having a climate similar to it in warmth and humidity, they thrive without any trouble being bestowed upon them, and come to great perfection. On the hills it will be useless to attempt the cultivation of these beautiful plants without a stove or hot-house. The method of cultivation best suited to them is to plant them in a soil composed of a little leaf mould and river sand mixed with charcoal and cocoanut fibre and pieces of old mortar or bricks broken up of the size of plums. Baskets made of galvanized wire, or wood, and filled with the above mixture, and having a plant or two of Lycopodium in it, have a very fine effect when suspended from the roof of a grass-conservatory. They also do very well on rockeries. But the most

essential condition for their successful growth is humidity, without which they will never develop to perfection. Lycopods are readily increased by suckers which they throw up plentifully, and which may be taken up and separately planted in pots or baskets. They also reproduce themselves by spores self-sown.

Selaginella.

These comprise the most beautiful of the Lycopodiacæ, and now form one of the most striking ornaments in Indian plant houses. Many of them can be grown as aquatics in pans of water, in which way they have a fine effect. Others, again, form quite a carpet of emerald green when grown on rockeries, covering almost every particle of rock and soil, the beautiful effect of which can be heightened by interspersing the carpet of green by planting at intervals such low and prostrate growing plants as Fittonias, Cyrtodeiras, Peperomias, Schismatoglottis, &c. Their cultivation is simple enough. If grown in pots, the soil must be light and open. Some well-decayed leaf mould and river sand, rendered loose with broken bricks, the size of cherries, or, better still, old mortar or concrete. Drainage must be thorough. Planted in this way they grow luxuriantly. Shade is absolutely necessary to bring them to perfection. With the exception of S. Lævigata and S. Serpens, all the other varieties must be grown in the plant-house.

For rockeries and raised beds I know of no plants better suited; in a short time they cover every nook and corner, giving the place a most refreshing appearance. If rockeries are made of large pieces of old mortar or concrete, and a little leaf mould and sand filled into the interstices, and Selaginellas planted into them, they will soon take root, and go on growing and spreading without any further trouble, beyond copious watering, for they love plenty of moisture.

The best time to plant is just about the commencement of the rains, for it is during the rainy months that Silaginellas are seen at their best. This applies equally to the hills, where, however, they must be grown under glazed shelter. About the end of February or beginning of March they begin their spring growth, after resting during the winter, and plants in pots should then be looked to and watered copiously.

They are easily increased by division during the rains. The best way to do this is to take out the root-ball from the pot and divide the entire plant, potting each rootlet separately into small two-inch pots. In the case of those on rockeries, all that is necessary is to take up the rhizomes, sever them from the parent stems, and transplant them.

The following are perhaps the best known and most cultivated in this country:—**S. Lævigata** is an old favourite, and a climber, having a metalic lustre of exceeding beauty. **S. Serpens** is the common variety mostly used for covering rockeries. **S. Kraussiana** and **S. Paradoxus** are also used for the same purpose. **S. Africana, Bellula, Brownei, Cæsia, Canaliculata, Caudatum, Caulescens gracile, Conferta, Cœrulea, Emelœ, Filicina Grovesii, Grandis, Involvens, Lyellii, Martensii Variegata, Triangularis, Uncinata, Victoriœ, Wallichii,** and **Wildenovi,** are best suited for pot-culture. One of the latest and handsomest introductions is **S. Tassellata,** from Brazil; it has erect stems, with flat closely pinnate branches and branchlets, from the tips of which are produced fertile quadrangular spikelets, giving the plant the appearance of being furnished with a profusion of tassels, which have a very striking effect.

POLYPODIACEÆ.

Felices.

FERNS.

FERNS comprise a very extensive genus of plants, all more or less remarkable for their grace and beauty. Being flowerless plants, they come under what are known as Cryptogams, or, according to Shirley Hibberd, "plants which celebrate marriages in the dark." The average amateur in India has an idea that Ferns are very difficult of cultivation, and for that reason very few Ferns find a place in the usual collection of plants grown for the decoration of the verandah or garden. As a matter of fact, Ferns are as easy of culture as any other order of plants, and only require the conditions in which they are found growing in a state of nature, or near as possible approximating those conditions, to bring them to perfection. Any one who has made it his business to collect Ferns on the hills, cannot have failed to notice that these lovely plants are invariably found growing in shady spots, overhanging a piece of water, a running brook or waterfall; that the soil in which they are thus found growing is fibrous, being a very light mould formed of decayed moss and leaves. Further, that wherever limestone rocks abound, there Ferns will be found to grow in greater luxuriance than even in peat or leaf-mould. By observing the natural conditions in which Ferns grow, one can form a very accurate idea of their wants. It will thus be apparent that in

order to cultivate Ferns successfully, we must reproduce, as near as possible artificially, the natural conditions referred to above.

Again, many species of Ferns may be seen growing out of crevices in brick walls, and that when these are pulled up by the roots, pieces of lime and mortar will be found adhering to the roots. This circumstance points to the fact that lime—especially old lime—is a substance in which Ferns delight very much. From extensive observations extending over many years, the reviser of the present edition of this work has come to the conclusion that almost every species of Fern may be successfully cultivated by being planted in a soil almost entirely composed of old mortar or concrete, with a small addition of well-decayed leaf-mould and sand. The roots of Ferns attach themselves firmly to the mortar, from which they derive their nourishment, and the plants themselves present a most healthy appearance.

It may, therefore, be accepted as a general rule that, in the case of nearly all Ferns, a soil consisting of old mortar or concrete—broken up into pieces the size of chestnuts — two parts, well-decayed leaf mould one part, and pure river, or coarse silver sand, one part, will form a compost most suitable for their cultivation in pots.

It has been noticed above that two essential conditions for the successful cultivation of Ferns are shade and moisture; without these it is useless to expect these lovely plants to grow to perfection. The grass-conservatory, as now constructed (*vide* page 36), supplies these conditions. Here there is a beautiful proportion of sunshine and shade, as any one who has visited the Ferneries in the Calcutta Botanical Gardens must have seen the perfection with which the Ferns are cultivated there. In the Upper Provinces, when the nights are frosty, a glazed structure becomes necessary to protect the plants during the winter months. Even in Bengal glass-houses have been found very useful during the cold months for sheltering Ferns. But, as a general rule, the grass-conservatory will answer all purposes.

On the hills, with the exception of the indigenous species, of which there are numerous varieties, very beautiful, a glazed structure—a hot house—is an absolute necessity if it is desired to cultivate the beautiful tropical species which form such striking ornaments in the grass-conservatories of the plains. The Adiantums, in particular, require a humid climate, which must at the same time be warm. Tree Ferns, Davallias, and the beautiful sweet-scented Gymnogramma Massoni, with many other lovely species, cannot be grown on the hills outside a hot-house. For those who cannot afford the luxury of such a structure, the ornamental glass Fern-cases, now so common in England, are recommended as admirably suited for the purpose. They can be had in all sizes and designs, at a comparatively cheap price. Even ordinary glazed frames (*vide* figures 4, 5, 6, page 37,), put up in a spot having

a southerly aspect, with a hot-bed for plunging the pots in, will be found good enough.

Thorough drainage is a *sine qua non* in Fern culture. To neglect this, is to undo everything that may be done in other respects. Although Ferns love plenty of moisture, they do not like water lying about their roots and stagnating there, rendering the soil sour and unwholesome. The pot in which a Fern is grown should be filled up fully one-third with large pieces of old mortar, kunkur, or bricks, with a layer of dry moss over the lot (if this is procurable). Then the prepared soil should be added, and the plant put in.

It may be added here that syringing the plants, or watering overhead with a watering-can having a fine rose—especially Ferns kept in a Verandah—in the hot months, as often as practicable, will keep them in very good health.

Nearly all Ferns can be multiplied by division of roots. Those that bear fertile fronds and produce spores can be raised from seed. The best plan, perhaps, is to fill up a pan, or pot, as described above, finishing off with a layer of very finely-sifted leaf mould and sand about an inch deep. Moisten the entire soil thoroughly twenty-four hours previous to sowing, and then scatter the spores lightly over the surface, covering it with a layer of live moss, if procurable, and place under a bell glass, or put a pane of glass over the rim of the pot, which place in a shady position, and in about three weeks or a month the spores will begin to start into growth. Great care must be taken in watering the pot, and the moss only should be damped by means of a very fine spray or rose. The operation of transplanting these seedlings is a very delicate one, and requires skilful handling to avoid injuring the minute and almost invisible root fibres. Another plan is to select an old brick, cover it with a layer of fine soil, as recommended above, sow the spores, cover over with a layer of live moss, and place the brick in a pan of water just sufficient to cover it to within one-fourth of an inch of the surface, and then place a bell glass over the lot. This will need no watering overhead, and is the plan largely adopted by most practical and successful gardeners in this country.

Since the last edition of this work was out, some hundreds of species of Ferns have been added to the old lists. Of course, the greater proportion of these will not be found beyond the Ferneries of the Royal Botanical Gardens, Calcutta. It would, therefore, be tedious to detail all these in a work like this. It has, therefore, been found advisable to describe those species and varieties only which, from their dwarfness, elegance, and general adaptability for ornamental purposes, are best suited for cultivation in gardens of moderate extent and pretensions. Ferns embrace such a very extensive family, that many works are extant specially devoted to them only, and those who wish for more

detailed information on this particular point, are referred to these several works, among which may be mentioned Shirley Hibberd's "Ferns, and How to Grow them," Beddome's "Ferns of Southern India," and a few others.

Hemionitis: Drymoglossum.

H. cordata and D. piloselloides, natives of Bengal, are curious for their fronds being like ordinary leaves, but otherwise are of little interest.

Gymnogramma.

Many species of this genus are of great beauty, being dwarf and remarkable for the fronds being covered with a farinose powder, and known in cultivation as Gold and Silver Ferns. **G. chrysophylla** is considered one of the most beautiful Ferns in cultivation; others noteworthy are—

G. tomentosa; ochracea; Martensii; calomelanus; flaveus; microphylla; pulchella, white powdery; and **triangularis,** sulphur-powder. **Massonii,** the sweet-scented Gold Fern; **Peruviana argyrophylla; decomposita, sulphurea,** and sp.from Darjeeling.

Nothochlœna.

Elegant dwarf Ferns, with fronds having a scaly or woolly surface, remarkable amongst which are—

N. lanuginosa; sinuata; rufa; trichomanoides; and most beautiful of all, **N. Eckloniana.**

Polypodium.

A very extensive genus, the several species of which vary much in aspect one from the other. Upon the whole not amongst the most ornamental. Indigenous about Calcutta are **P. proliferum; P. glabrum; P. adnascens;** and **P. quercifolium.** Natives of India and noted for their size and beauty are **P. Wallichii; P. Horsfieldii; P. Lobbianum;** and **P. coronans,** with tall, slender, rod-like stipes, and fan-shaped palm-like fronds. Others noteworthy are **P. albo-squamatum; sub-auriculatum; plumula; pectinatum; setigerum semiadiantum; eriophorum; tenuisectum; dareæforme. Nigrensis,** having a black appearance; **Sporodocarpium; tridactylon;** and **Virens,** all beautiful.

Cheilanthes.

Ferns of small growth, delicate texture, and exquisite beauty, notable amongst which are **C. argentea**, the varieties of which are familiar in Assam under the name of Gold and Silver ferns, from the pulverulescence on the under side of their fronds; **C. elegans**; **radiata**; **multifida**; **farinósa**, *var.* **Mexicana**; **myriophylla**, very lovely; and **lendigera**.

Adiantum.

MAIDEN-HAIR FERNS.

A very extensive genus, comprising perhaps some of the most beautiful Ferns in cultivation. There is a remarkable similarity in their general aspect, so that an Adiantum cannot be mistaken for any other species. Their greatest recommendation is that they are easy of cultivation. During recent years considerable additions have been made to their number.

In the Calcutta Botanical Gardens, and some of the large nurseries about Calcutta, there are, perhaps, about seventy varieties in cultivation. They all love shade and moisture. Nearly all the varieties bearing fertile fronds can be propagated by sowing the seeds or spores. Some of them are easily increased by division.

The following list comprises the most beautiful of the genus, and may be relied upon as sufficient for all ordinary purposes:—**A. Farleyense**; this is *par excellence*, the most beautiful species in cultivation, and must be grown in a glass case to bring it to perfection. **Lunulatum**, common about Calcutta growing out of old walls; **Gracilimum**; **Aneitense**; **Amabile**; **Concinnum**, and **Concinnum latum**; **Dolabriforme**; **Lowsonii**; **Luddemanianum**; **Macrophyllum**; **Pedatum**; **Rhodophyllum**; **Cuneatum**; **Scutum**; **tenerum**; **Princeps**; **Peruvianum**; **Seemannii**; **trapaziforme**; **Veitchii**; **Villosum** and **Capillus Veneris**, the old maiden-hair.

The following are most of the other species in cultivation. They are all more or less remarkable for their beauty, and are included here to render the list as complete as possible:—**Assimile**; **Bauseii**; **Bellum**; **Ciliatim**; **Cultratum**; **decorum**; **cuneatum dissectum**; **Curvatum**; **Edgeworthii**; **Excisum multifidum**; **Flemingii**; **Formosum**; **Foxii**; **Funcki**; **Hendersonii**; **Fulvum**; **Hispidulum**; **Intermedium**; **Legrande**; **Lowii**; **Neoguinense**; **Pulverulentum**; **Recurvatum**; **Rhomboidum**; **Rubellum**; **Sancta Catherinœ**; **Shepherdii**; **Speciosum**; **Tinctum**; **Velutinum**; **Wilsonii**; **Victoriœ**; **Gheisbrightii**; **Monochlamys**; **Williamsii**, and **Wilesianum**.

Pteris.

P. amplectens.—A common weed about Calcutta; fronds pinnate with the pinnæ five or six inches long, of the form of a blade of grass. A spare dark corner in the garden should always be assigned to this handsome Fern, as a frond or two inserted in a bouquet has a delightful effect.

Among many of this genus may be mentioned for their beauty, **P. semipinnata**; **leptophylla**; **Cretica**, *var.* **albolineata**, **quadriaurita**, *α. var.* **argyrea**, *β. var.* **leucophylla**; λ. *var.* **multifida**; **podophylla**; **aspericaulis**, *var.* **bicolor**; **serrulata**, *α. var.* **cristata**, *β. var.* **polydactylon lacerata** and **variegata**; **dentatum**; **ludens**; **nobilis**; **tricolor**; **umbrosa**, and **undulata**.

Asplenium.

A very extensive genus of Ferns, varying much as to aspect, some having their fronds entirely simple, and some finely divided.

A. nidus, *var.* **Australiacum**—BIRD'S-NEST SPLEENWORT.—A truly noble and most ornamental Fern, with fronds a yard or more long, somewhat like those of a Plantain, but tapering to a point; of purest pale apple-green, against which their dark chocolate ribs and bases form a handsome contrast; long cultivated about Calcutta, where it thrives well in a pot or in the border under shade.

Amongst those most remarkable for dwarfness and the exquisite beauty of their finely-divided fronds are **A. cicutarium**; **umbrosum**; **Fabianum**; **laserpilifolium**; **viviparum**; **Belangeri**; **brachypteron**; **rachirhizon**; **mucronatum**; **deliculatulum**; **adiantioides**; **Halleri**; **rutaceum**; **ferulaceum**; **formosum**; **bulbiferum**; **præmorsum**; **acuteatum**; **esculentum**; **goringianum**; **tricolor**; **hispidum**; **lanceum**; **nitidum**; and **veitchianum**.

Actiniopteris.

Curious and most interesting Ferns, resembling minute Fan-palms. **A. flabellata** is a native of India, grows on old walls and out of rocks at Agra. **Radiata** is the Fan-Fern.

Onychium.

O. lucidum.—A Fern of exceeding beauty, with pinnatifid, spray-like fronds; native of Nepal, and thrives well in Calcutta gardens. **Japonicum** is also a beautiful variety.

Nephrodium.

Contains some very beautiful species, among which are **N. invisum**; **latifrons**; **recedens**; **sanctum**; **molle**, *var.* **corymbiferum**; **cuspidatum**, and **polynosphum.**

Aspidium.

Upon the whole not very ornamental Ferns.

1. **A. proliferum.**—A beautiful species, with large, finely-divided, plume-like fronds; thrives well about Calcutta.

2. **A. squalens.**—A common Fern, tolerably pretty, the frond consisting of the mid-rib, with a row of green comb-like teeth on each side.

A. Klotzchii and **A. denticulatum** are very graceful and feathery; and **A. triangulare**; **A. falcatum**, says Sir W. Hooker, coveted by Fern-growers for its beauty. Also **Germinyi**; **trifoliatum**; and **macrophyllum**; of later introduction, and considerable beauty.

Davallia.

Among the handsomest Ferns of the order. Some two or three species from Port Blair have been long in the Agri-Horticultural Society's Gardens. These, like many of the genus, have white woolly stems about the thickness of a man's little finger, which lie flat upon the ground or the object that supports them, in delightful contrast with the elegant verdant plume-like fronds.

Especially to be noted for their beauty are **D. Affinis**; **canariensis**, the Hare's-foot Fern; **ciliata**; **leucostegia**; **stenoloma**; **bullata**; and **elegans**, *var.* **dissecta**, a truly lovely object as seen clinging to a log some six feet high. **Fijiensis**, and **Fijiensis plumosa**, are perhaps the most beautiful in cultivation, and are recent introductions. Other beautiful species are **Mariesii**; **Mooreana**; **Pentaphylla**, and **Tyermanni**, all later introductions.

Alsophila; Cyathea.

Genera consisting principally of tree Ferns, some few of which have been introduced into the Calcutta Botanical Gardens, but are too large and coarse for a private garden. The two best for general cultivation are **A. Australis**, and **Cooperii.**

Trichomanes.

The most delicately beautiful of all the Fern tribe. They require constant humidity and shading, and great care and attention to cultivate them successfully. Amongst the most ornamental are—**T. pinnatum**; **crispum**; **Leprierii**; **Mallingii**; **spicatum**; **Javonicum**; **Bancroftii**; **Spruceanum**; **and pluma.**

Gleichenia.

Sir W. Hooker states of **G. dicarpa** that "no Fern at Kew is more admired for its graceful form, with tender feathery, drooping branchlets;" and of **G. flabellata,** with its large, date-palm-like fronds, that "Kew does not boast a more lovely Fern."

Lygodium.

L. scandens—CLIMBING FERN.—A native of Mysore; thrives well in the locality of Calcutta; a slender, graceful, climbing plant, with exquisite filigree-like fronds. Another lovely variety is **L. cirnectum.**

Antigramma.

A genus of Brazilian Ferns, closely allied to **Asplenium** and lately introduced into this country. There is only one variety cultivated out here, *viz.*: **A. Brasiliensis,** a beautiful object when well grown.

Athyrium.

This genus is also closely allied to the **Aspleniums,** with which it is confounded by some. The **A. Felix-femina,** a beautiful British species, is found in great abundance on the upper Himalayan ranges. The only tropical species cultivated on the plains, and recently introduced is **A. Goringianum tricolor,** a lovely species, but rather difficult to cultivate. Must be grown in a grass-conservatory.

Blechnum.

An extensive genus of Ferns, allied to Lomaria, natives of Europe and the tropics. They are not particularly remarkable for beauty, having plain fronds. The best perhaps is **B. Occidental,** a native of tropical America.

Deanstædtia.

These are what are known as herbaceous Ferns, the only variety worth cultivating out here being **D. Davallioides Youngii.** Closely allied to **Dicksonia.**

Dicksonia.

A genus of noble Arborescent or Tree Ferns, natives principally of the Southern hemisphere. **D. Antarctica** is perhaps the most beautiful variety, native of Australia, and grows fairly well in Bengal in a grass-conservatory.

Hymenodium (Dictyoglossum),

Allied to **Acrostichum**, natives of the West Indies. The best for cultivation are **H.** (**D.**) **Japonicum Variegata,** having a variegated surface.

Doodia.

Handsome Ferns, natives of New Holland. The variety met with in this country is **D. Blechnoides**. Grows well in a grass-conservatory.

Drynaria.

An extensive genus, spread over a large area. Varieties are found throughout the Himalayan upper ranges, on the plains, in Australia, and the West Indies. There are few species only worthy of a place in a garden collection. The Oak-leaf Ferns, found on the hills, are of this genus. **D. Musœfolia,** which resembles a dwarf plantain tree, is about the only variety I have seen in cultivation in Indian collections. The genus is closely allied to **Polypodium,** that being one of the synonyms under which it is known.

Hypolepsis.

A small family, are tropical, principally natives of the West Indies. Closely allied to Cheilanthes. The only variety worthy of a place in a collection being **H. Elegans**. Requires shade and moisture to grow it to perfection.

Lastræa.

Nearly all of this handsome family are tropical; many of them natives of India and Ceylon. There are nearly a hundred varieties

enumerated by botanists. Those which I have met with in cultivation, and which deserve a place in a Fern Collection are : **L. Aristata variegata,** a very fine species; **L. Glavella,** a native of New Zealand; **L. Richardsii multifida** and **aristata**, perhaps the two handsomest. A few representatives of **Lastræa** are also to be found on the hills, where they are indigenous. Rather a difficult genus to cultivate successfully, requiring a decidedly limey soil.

Lomaria.

A few of this genus might be cultivated with advantage. None of them are natives of this country, tropical America and Australia being their habitat. **L. Gibba,** from New Caledonia, and **L. Lanceolata**, from New Zealand, being the only two I have met with in this country. Very easy of propagation by division.

Nephrolepis.

A genus comprising a few beautiful species. Very easy of culture. **N. furcans** forms a magnificent object, with its large drooping fronds, having a bunch at the end of each. As a specimen Fern, there is scarcely another to surpass it. **N. Duffii** is also a very pretty object when well-grown. Well suited for hanging baskets. **N. Augustatus**, and **N. decuroivo-pinnatum** may also be included in a collection. All very easily increased by division.

Osmunda.

This genus includes what is known as the flowering Fern, or King or Royal Fern, the **O. Regalis**, a British species, which, however, can be grown out here successfully in a grass-conservatory. **O. palustris** is also a pretty Fern. On the hills these Ferns grow remarkably well, and without any trouble.

Phlebodium.

A handsome genus of net-veined tropical Ferns. The only variety met with out here is **P. Aareum**, or golden Fern, a beautiful object when well-grown; native of tropical America. Must have absolute shade and much humidity to bring it to perfection.

N.B.—It has not been considered advisable to include here the many varieties of Ferns to be met with on the hills, and which grow there in a wild state, as it has been found impossible to cultivate them on the plains. Nor has it been thought necessary to include such as are so rare as to be almost beyond the reach of amateurs, and which only find a place in bota-

nical collections, not on account of their beauty and usefulness, but for purely botanical interests, to complete the collections for purposes of classification and study. The present work does not profess to be a botanical treatise, but a manual of gardening only.

GRAMINACEÆ.

GRASSES.

Very few plants of this order are suited for the garden; and most that are worth cultivation are best kept in pots, as when grown in the border they present a wild, weedy appearance. All propagated easily by division and seed.

Arundo.

1. **A. versicolor** — RIBBON-GRASS — GARDENER'S-GARTERS. — This pretty striped Grass, so useful for giving beautiful effect in a bouquet, is a common plant in gardens in most parts of India.

2. **A. Donax.**—The name seemingly of a very handsome Grass lately introduced, much like the preceding, but with stouter stems, and more than six or seven feet high.

Gynerium.

G. argenteum—PAMPAS GRASS.—This noble and truly ornamental Grass, bearing panicles like large silver-white feathers, on stems as much as ten or twelve feet high, has been raised from seed in the Botanical Gardens, where it is found to thrive satisfactorily.

Bambusa.

BAMBOO.

Bâns.

In those parts of India, where Bamboos are less common than in Bengal, a small clump is a very ornamental object in gardens that have room for it. **B. aureo-variegata** has been introduced from Europe, and there exist there many varieties which might prove desirable.

B. nana.—A dwarf species which, as Dr. Roxburgh observes, makes a beautiful hedge. Propagated by cuttings and seeds.

Apuda.

A. aristata—A pretty plant when grown in a pot, resembling a diminutive Bamboo, about a foot and a half high.

Andropogon.

1. **A. Shœnanthus**—LEMON-GRASS.—*Aghia-ghass.*—Common in gardens in all parts of India, cultivated for the fine fragrance of the leaves, which are often used for flavouring custard.

2. **A. Martini**—RONSA-GRASS.—Native of the hilly parts of the Deccan; famous for the fragrance of its leaves from which a fine-scented essential oil is extracted, considered a specific for rheumatism.

ARACEÆ.

Arum.

1. **A. pictum.**—Grown in a pot, is a beautiful plant for the decoration of a verandah. The central portion of the large arrow-headed smooth leaves is of a pure pale rose-colour, losing itself gradually into the dark verdant green of the edges. The leaves die down in the cold weather. It puts forth its flowering spathe in April, which is of a pallid-green colour, and of no interest. To develope the leaves to their full perfection of beauty, it requires a good light soil, rather rich, and an abundance of water and shade. Easily propagated by offsets of its roots.

2. **A. Dracunculus.**—A Cape rhizomatous plant, the principal beauty of which consists in its smooth, upright, bright-green stem, strangely spotted and mottled with white like a snake; bears in March a large chocolate-red spathed flower, emitting an intolerably offensive smell. It blossomed with me the first year of its being brought from the Cape; and the rhizomes produced fine plants a second season, but after that perished.

The leaves die down in April; and the same mode of cultivation, in every respect, is suited to this plant as that recommended below for the Richardia.

Alocasia.

A genus of plants that has come into popular favour recently on account of the rich colouring of the leaves of many of the later introductions. They are very easy of cultivation, and for this reason are a great acquisition to the plant house, and for decorative purposes

generally. A soil composed of leaf-mould and sand in equal proportions, with two parts of old mortar or concrete and a little garden loam, suits them admirably. Drainage must be thorough, or they will perish. Being tuberous-rooted, are easily increased by separating these at the time of potting in March and April after the winter's rest The stems should be allowed to die down in the winter by withholding water about the middle of November. This applies to the plains of Upper India and the hills. In Lower Bengal they sometimes grow as perennials: but even there it is advisable to allow the stems to die down. Shade and moisture are necessary to bring them to perfection by developing the beautiful rich colouring of the leaves. Should always be grown in a grass conservatory on the plains, and under glazed shelter on the hills,

The following are about the best known and most beautiful varieties:—**A. metallica**—Native of Borneo, and an old favourite, with large heart-shaped bronze-coloured leaves: having the appearance of a metal shield. The other old varieties are **A. argyroneura: marmorata; zebrina; Veitchii; Lowii; amabilis; Boryana; Illustris; Jenningsii; Microrhiza variegata; picta; violacea:** *var.* **alba** and **Purpurea.** The newer varieties are **A. Chelsonii; Johnstoni,** from the Solomon Islands, with semi-erect, arrow-shaped, olive-green leaves, variegated and veined with rosy red; **Sanderiana,** a very handsome variety from the Eastern Archipelago, with large arrow-shaped, sagittate much-lobed leaves, erect, of very dark glossy green of metallic lustre, the midrib and veins of white, as well as the margins; perhaps the handsomest variety in cultivation. **Thibautiana,** in colouring and marking very similar to the preceding, except that the leaves are entire and ovate. **Reginæ,** a distinct species from Borneo, of large growth, the leaves being almost round, fleshy, and of a dark metallic greyish-green in the upper, and purple on the lower surface. **Marshallii, Mariesii, Putzeii, Sedeni,** and **Singaporiensis,** have also been lately introduced, and are remarkably handsome foliage plants.

Colocasia.

C. odorata.—A native of Pegu; described as growing with a caudex of three or six feet high, and from four to six inches in diameter, crowned with a head of large narrowly-cordate leaves on stout footstalks; a plant of truly noble aspect. The fragrance of this species renders it very desirable. The diffused odour resembles that of Mignonette, but on nearer contact that of some Orchids. Under the name of Arum odorum it is met with here, but only in a dwarf, unthriving

state. **C. gigantea** is an immense growing species, and forms a noble object in a plant house.

Caladium.

A genus of tuberous-rooted plants, natives principally of the Brazils and Amazons, of recent introduction into Europe; eminently beautiful for the remarkable manner in which their spacious arrow-headed, rich green leaves are spotted and blotched with white, or white, pink, rose and red. They seem all to thrive exceedingly well in this country, and some few of them may be looked upon now as all but indispensable ornaments of the verandah. They are best kept entirely in the shade, and under shelter. When in vigorous growth they require abundance of water, and are benefited, by a liberal supply of liquid manure. Upon the leaves beginning to fade at the end of the rains, water should be gradually withholden, and when the stems die down, they should be put away in their pots, just as they are, in some dry place. About the middle of March, when they begin to start again, they should be turned out of their pots, and re-potted in fresh soil with the crown of the bulb above the soil.

The young offshoots they may have made should be cut off, and potted in pure sand till they have made roots, and then be re-potted. They require a light, not over-rich, soil. That recommended for Alocasia will suit them admirably. If a thin layer of charcoal powdered is laid on the soil in the pot, the glowing colours of the leaves are said to be considerably heightened.

In Vol. I, new series, of the 'Agri-Horticultural Journal,' a description is given by Mr. S. Jennings of as many as thirty-five of these plants, nearly all distinct species; and in the English plant-lists are set down full as many more, hybrids or varieties. The whole of these are, or may be, in India. I have not space to describe them, nor even to give their names, nor would it be worthwhile if I did. The best plan is to send an indent on any of the large English plant-merchants for a collection of tubers of the best varieties, of which there are over a hundred in cultivation; they should arrive in March and be immediately potted off: This will form the nucleus of a stock, which can be added to year by year, if desired. I just describe some five old well-known and handsome kinds, to give a notion of the general character of all.

1. **C. amabile.**—Leaves bright green with irregular blotches of white; nervures greenish white.

2. **C. argyrites.**—Leaves of a cheerful flat green, covered with large irregular blotches of dead silver white, with numerous spots of the same on their borders. A small plant, and, in my opinion, about the most beautiful of all. It is rather delicate, and apt to perish during its period of rest.

3. **C. Belleymei.**—Leaves wavy at the border; bright green, bespattered with irregular white spots and daubs of red.

4. **C. Chantini.**—Leaves bright clear green, densely speckled with white; nervure crimson; very gay and beautiful.

5. **C. Wightii.**—Leaves clear pea-green, sprinkled here and there with crimson and white blotches; a very beautiful plant.

6. **C. virginale**, pure white transparent leaves, veined bluish-green.

7. **Reine Marie de Portugal** and **Le Titien**, two distinct species.

Richardia.

R. ethiopica—PIG LILY.—A most noble object when in blossom, with its large, pure white, washleather-like spathe surmounting its great luxuriant, dark-green arrow-headed leaves. A native of the salt-marshes at the Cape. Quite naturalised seemingly at Ootacamund, but very rarely seen in blossom in Calcutta. I have raised plants in abundance from seed from the Cape, and been so fortunate as to have the plant in blossom two years from the time of sowing. Sir J. Paxton's directions for the cultivation of it in Europe apply equally well to this country.

"In potted plants the leaves generally begin to decay about May, when move the pot into the open air, and give plenty of solar light, and only sufficient water to prevent the leaves from dying off suddenly. When the leaves are completely withered, remove to where it can be preserved from wet. Sprinkle the soil occasionally to prevent it from becoming dust dry. In November pot it, and water more liberally. Soil, sandy loam, with slight admixture of leaf-mould and rotten manure."

While in vigorous growth put the pots in pan-feeders, continually supplied with water, in a situation where the plant may have as much light as possible, short of absolute sunshine, which would turn the leaves brown. It blossoms at the end of March. During the rains the dormant rhizomes are very apt to rot; therefore, if they are kept wet at all, they are better preserved perhaps by being exposed continually to the rain than by being subject to the stale moisture of any covered place. It is said to "grow as an aquatic, placed in its pot at the bottom of a pond not deeper than three feet." Propagated easily by division in October when the plants are repotted.

PANDANACEÆ.

Pandanus.

P. odoratissimus — SCREW PINE. — *Keôra Kêtkee.*—A large shrub ten or twelve feet high, native of India, and very common; named in

reference to the curious screw-like arrangement of its long, spine-edged, sedge-like leaves on the summit of the stems. It extends over a large space by sending down aërial roots from its branches. Blossoms during the rainy season with panicles of large white, sheath-like leaves, enclosing spongy-looking bundles of closely packed minute flowers. Dr. Roxburgh says :—

"It is the tender white leaves of the flowers, chiefly those of the male, that yield that most delightful fragrance for which they are so universally and deservedly esteemed. For of all perfumes in the world it must be the richest and most powerful."

It appears to thrive best in low swampy ground. Where a garden is of extent large enough to admit it, the exquisite sandal-wood-like perfumes of its flowers renders it very desirable. Propagated readily by cuttings put down in the rains.

Some of the dwarfer kinds in cultivation for decorative purposes are: **P. bifurcatus**; **gracilis**; **moschatus**; **pygmœus**; **utilis**; **variegata**, and **Veitchii**.

Carludovica.

C. Drudei.—A plant lately introduced into this country from the United States of Columbia. It resembles a Fan Palm, with its handsome deep green lustrous leaves, and is a striking object in a conservatory. It is a species of this genus, **C. Palmata**, which yields the straw or fibre out of which the well-known Panama hats are made.

PALMACEÆ.

PALMS.

For general decorative purposes Palms take a prominent position, and no garden collection is complete without them. In fact, in recent years they have risen greatly in popular favour. Their cool and delightful appearance when in health, and the tropical air they impart to a garden or plant house, have made them universal favourites. Many of the grandest species only retain their beauty and usefulness for decorative purposes up to a certain age, after which they become somewhat unwieldy and unmanageable; but during the period that they retain their dwarf growth, they amply reward the trouble and care bestowed upon them.

Many of the palms are natives of this country,but, as a rule, the most beautiful specimens come from various parts of the tropical world,

being widely distributed. To grow the latter to perfection, a grass conservatory is necessary on the plains, and a hot-house on the hills.

They are all more or less easy of cultivation. A soil composed of leaf-mould, sand, a little well-decayed cow-dung and common garden soil, in equal proportions, will suit them admirably. Drainage must be thorough, or they will damp off. For the common species, scarcely any care is necessary.

Nearly all Palms bear seeds freely, and are therefore easily propagated by sowing the seed, chiefly during the rainy months. They sometimes take a long time to germinate, and for this reason any pot in which Palm seeds have been sown should never be neglected till a whole year has passed away.

The following list will be found to contain, it is believed, nearly all the species worth cultivating out here. Of course, there are many species in the Royal Botanical Gardens, Calcutta, which it will be difficult to procure elsewhere, and many additions in recent years which have not even been named yet. These have necessarily been left out for obvious reasons.

Areca.

1. **A. oleracea**—CABBAGE PALM.—Is, when about eight or ten feet high, the handsomest far of all the Palms. Nothing indeed can surpass it in stateliness and elegance, the only part of the stem visible above the earth being the long, smooth, bright-green, gracefully-formed portion just below the fronds. When the trunk grows up and displays itself at its full height, the beauty of the Palm is mainly gone.

2. **A. catechu**—BETEL-NUT PALM—*Soopâri.*—This by many is considered the most graceful and elegant of all our Palms. It has the merit of being one of the smallest, and may therefore be admitted into gardens of but moderate extent. Mr. Markham observes :—

"I have seen Palm-trees in the South-Sea Islands, many kinds in the forests of South America, and in India ; but of the whole tribe the Betel-nut Palm is certainly the most elegant and beautiful. Dr. Hooker likens it to an arrow shot from heaven, raising its graceful head and feathery crown in luxuriance and beauty above the verdant slopes."*

The more recent introductions are : **A. aurea**, with golden stem ; **A. Baueri** ; **crenata** ; **disticha** ; **gracilis** ; **horrida** ; **lutescens** ; **Madagascarensis** ; **triandra** ; **rubra**, and **sapida**, all well worthy of cultivation.

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* 'Travels in Peru and India,' p. 349.

Arenga.

A. saccharifera.—A beautiful and magnificent Palm, throwing up erect from the sides of the trunk its enormous shining black-green leaves, which take a graceful plume-like curve towards the summit. This has a fine ornamental effect when grown by the entrance-gate to a garden. **A. obtusifolia,** somewhat different; and **A. wightii,** a beautiful species, lately introduced.

Caryota.

C. sobolifera.—Grows with a group of stems in the manner of a Bamboo, and bears curious leaves of the size of a man's hand, which have been aptly likened to a fish's tail. A small clump kept within bounds would, no doubt, have an ornamental effect

C. urens.—Is the "Wine Palm" of Ceylon, and a splendid object in a garden. It is common to many parts of India, and bears seeds abundantly.

Calamus.

RATAN.

Bêt.

Some of the different kinds of Cane are pretty when young, but are of far too rambling a habit to be adapted to a garden. The most graceful being **C. Roxburghii, a** handsome hardy species, and **C. ciliaris,** a dwarf erect-growing species, very beautiful when well grown, and admirably adapted for pot-culture.

Livistonia.

L. Mauritiana.—A beautiful Palm, and a truly delightful ornament when, as it is occasionally seen, grown as a young plant in a large flower-pot. The way in which the broad, graceful, plume-like leaves overlap one another and dispose themselves, renders it eminently handsome. When large it resembles very much the common Târ-tree. **L. australis**; **Hoogendorhfli**; **rotundifolia** and **Sinensis,** are recent introductions, and are splendid objects in a plant-house.

Chamærops.

C. Martiana.—Very beautiful for its leaves, which are borne on long footstalks, and are fan-formed, with the ribs projecting like spikes to a great distance all round from the body of the leaf.

C. Fortunei and **humilis** are both well-known species, and remarkably handsome when young.

Astrocaryum.

A genus of the tribe Cocoineæ, natives of tropical South America, and represented in this country by a single species, **A. argentium**, which is a striking object, with its large pinnate leaves, having a silvery hue. Being an exotic, it cannot be grown outside of a grass-conservatory.

Ceroxylon.

Natives of tropical South America. The variety in cultivation is **C. niveum**, and is a beautiful object when well grown. The **C. andicola** is the Wax Palm of New Grenada, but cannot be got to grow out here.

Cocos.

Of recent years many additions have been made to this family, which is represented in this country by the well-known cocoanut palm. The new varieties are dwarf and very handsome ornaments, the most elegant being **C. Weddelliana**, with its slender erect stems, and gracefully arching leaves, of a rich green. **C. plumosa** is a native of Brazil, with plume-like leaves of dark green; a most attractive palm. **C. campestris**; **flexuosa**, and **nucifera aurea** (the King Cocoanut), are all worthy of a place in a plant-house.

Corypha.

FAN PALM.

A genus of tropical fan-leaved palms mostly natives of Asia. They grow to a great height, but when young, present a most striking appearance, with their immense leaves. **C. umbraculifera** is a native of Ceylon and the Malabar Coast, where the leaves are used for a variety of purposes. **A. Australis** is of smaller growth, and of decidedly ornamental character; it is from South Australia. **C. elata** is a native of this country, and grows to a height of 150 feet; but very ornamental when young.

Dæmonorops.

This is another name for the great Calamus family; in fact it may be regarded as a synonym only, as they are all usually classed as

Calamus. The most distinguishable variety is the **D. fissu**, which is of somewhat dwarf growth, and having a handsome appearance when young.

Dictyosperma.

This is a synonym for the large family known as Areca, and by some botanists classed as a separate genus. **D. alba**, known as such, is a handsome palm, the leaves having a silvery appearance at times.

Diplothemium.

A genus of Brazilian palms of recent introduction, and remarkable for being stemless, for which reason they are desirable for pot culture. The variety met with in cultivation in this country is **D. Martimum**, having the under part of the leaves of a silvery hue.

Euterpe.

Very graceful palms, natives of tropical South America; where they form a striking feature of forest scenery, growing in large clumps. They love moisture and shade, and will not thrive where these conditions are absent. When young, with their slender cylindrical stems surmounted with a tuft of fine bright green leaves, they present a most handsome appearance. **E. edulis**, cultivated here, is the Assai Palm of Para, (also known as **Oreodoxa Sancona**), and an acquisition to the plant house.

Geonoma.

A genus of very handsome palms of dwarf growth and slender polished stems, all natives of tropical South America. They grow to perfection in our grass-conservatories. The most desirable variety is **G. gracilis**, a beautiful object for dinner-table decorations with its drooping, polished green leaves. **G. Carderi**; **princeps**; **pumila**; **Schottiana**, and **Seemani**, are also in cultivation here, and worthy of a place in the plant-house. All love shade and moisture.

Hyophorbe.

Handsome palms, natives of Bourbon and Mauritius, with tall cylindrical stems, and a crown of graceful pinnate leaves. Very ornamental when young. **H. Amaricaulis** is a well known species, and much resembles an Areca; **H. Verschaffeltii** is a recent introduction of dwarf habit; also known under the name of **Areca Verschaffeltii**. **H. Indica**, is a native of this country, and is generally known as

Areca lutescens. All are easy of culture, and bear seeds abundantly, from which they may be readily propagated.

Kentia.

A handsome family of palms, natives of the Malayan Archipelago, Norfolk Island, and New Zealand. In general appearance they do not differ much from Arecas, and are only distinguishable from them by not having the nutmeg-like structure of the seed of true Arecas. About half a dozen species are in cultivation in our gardens, chiefly in grass conservatories. The most desirable varieties are **K. MacArthuri** and **Belmoreana. K. Australis**; **macrocarpa**; **Fosteriana**; **gracilis, and Wendlandiana** are also worthy of a place in the plant-house.

Korthalsia.

This is a name given to about half a dozen species of palms, which are, however, so closely allied to **Calamus** as to be hardly distinguishable from them in general appearance and habit of growth. They are natives of the Indian Archipelago, mostly climbers, and a plant or two of **K. Junghulmi** I have seen growing in Calcutta struck me as being worthy of a place in a collection of palms.

Latania.

A family of ornamental palms, with fan-shaped leaves, natives of South Africa and the Islands of Bourbon and Mauritius; rather difficult to grow successfully in this country. They grow to twenty feet high. **L. Commersonii** (*Syn.* **L. rubra**), is a handsome species with red stem, and rich shining bronzy-green leaves; **L. aurea**; **Borbonica** and **glaucophylla** are also well worth cultivating.

Licuala.

A genus of majestic palms, mostly natives of the Indian Archipelago, and thriving very well in this country. **L. peltata** and **palmata,** with their fan-shaped leaves having lacerated edges, have a fine effect when well grown. **L. grandis** (now known as **Pritchardia grandis**) found in Borneo and the South Sea Islands, only recently introduced, is perhaps the grandest palm in cultivation. Nothing can equal it in majestic beauty, with its immense rounded, lace-edged leaves of a bright polished green, growing out of a central base and forming a cluster not easily forgotten. Fortunately, they are all easy of cultivation in our grass-conservatories.

Martinezia.

South American palms of somewhat dwarf growth; remarkable for the spines with which the cylindrical stem and leaf-stalks are armed. **M. caryotæfolia** is perhaps the only one of the genus worthy of a place in the plant-house. Seeds abundantly.

Drymophlœus.

A recent introduction, and a remarkably handsome genus, represented here by **D. Singaporensis,** with its slender stems and rich green leaves on smooth green petioles, of drooping habit. Being a native of Singapore, from where it has been introduced, it thrives to perfection in a grass conservatory. During the rains it presents a strikingly handsome appearance with its bunches of deep purple coloured fruit. Easily increased by seed.

Oreodoxa.

A genus of remarkably handsome palms, natives chiefly of tropical South America and the West Indies. One of the species, **O. oleracea,** described elsewhere as **Areca oleracea** (by which name it is generally known) is almost naturalized in this country. Beautiful avenues of it are to be seen in the Calcutta Botanical Gardens. Two other dwarfer varieties of much beauty, *viz.*, **O. acuminata** and **regia,** are in cultivation in some gardens about Calcutta.

Phœnix.

A genus of ornamental and economic palms, including among its members the Date Palm (**P. dactylifera**), and Sugar Palm (**P. Sylvestris**). Of those suitable for decorative purposes, **P. rupicola,** native of this country, is the handsomest and most desirable on account of its dwarf and elegant growth, the leaves drooping and falling over gracefully; and being very easy of culture, whether indoors or out of doors, is an acquisition. Easily raised from seed. The other varieties cultivated here are **P. acaulis; reclinata; rubricaulis; Senegalensis; paludosa,** and **Zeylanica;** all more or less ornamental objects in a collection.

Pinanga.

The palms known under this name now, include some of the handsomest in cultivation. They are mostly natives of the Indian Archipelago. The generic name has undergone four different changes. **P.**

maculata is the mottled palm, and is unique in appearance; **P. spectabilis** is a well known species, having dark green petioles, mottled with light green, the under surface of the leaves having a silvery appearance; while **P. Veitchii** and **Sanderiana** have only lately been introduced; but they are of remarkable beauty and grace. They all seed freely.

Pritchardia.

This genus, closely allied to **Licuala**, contains two of the grandest palms in cultivation—**P. grandis** and **pacifica**; the first of which has been described under **Licuala**, while the second resembles it much in general appearance, but is not so imposing an object. They are nearly all natives of the Fiji Islands and the Indian Archipelago. There are two other varieties in cultivation, *viz.*, **P. Chinensis** and **filifera**, both handsome species. They take a long time to bear seeds, but these can always be imported. All the species thrive excellently in grass conservatories.

Ptychosperma.

Handsome palms, natives of the Indian Archipelago, and thriving remarkably well in our grass conservatories. They are closely allied to Seaforthia, which they resemble. One of the most elegant is **P. Alexandræ**. There are several other species, but only **P. alba**, besides the above, is cultivated here, so far as I have been able to ascertain.

Rhapis.

Dwarf, ornamental palms, natives of Eastern Asia. The leaves are fan-shaped, and grow in dense tufts, deeply cut into segments. The stems are reed-like and polished green. The old, well-known species, **R. flabelliformis**, is a native of Southern China and is called the Ground Rattan Palm; **R. humilis** is a recent introduction, and a desirable acquisition to our plant houses. Both seed freely, and may be thus easily increased.

Sabal.

A genus of noble-looking palms, natives mostly of Southern North America; some of them are found in the West Indies. They are dwarf in growth, and very ornamental, having fan-shaped leaves. **S. Adansoni** is a North American species, while the other variety cultivated in this country, **S. umbraculifera**, (*Syn.*-**Blackburniana**) comes from Jamaica. Some of these palms throw up suckers, which

can be separated and will form nice plants. They grow well in our grass conservatories.

Seaforthia.

A family of very ornamental palms, comprising about thirty species, principally natives of Sumatra, Java, Borneo, and other Islands of the Indian Archipelago. One species, perhaps the handsomest, **S. elegans**, comes from Australia. It is a striking ornament in our grass conservatories. **S. robusta** is another fine species; and being of dwarf growth, is a very desirable variety to have. The two named here are perhaps the only ones that should be admitted into an ordinary collection.

Stevensonia.

S. grandifolia.—One of the handsomest palms in cultivation, the genus being represented by this one species, which is now known under the name of **Phœnicophorium Sechellarum.** It is a native of the Seychelles Islands. It is a stemless palm, from the base of which spring copper-coloured stalks studded with black spines. The leaf blade is wedge-shaped, of a beautiful bronze hue, and spotted. When young, the leaves are very handsome, being of a rich cinnamon-brown colour. Grows very well in a grass conservatory.

Thrinax.

A genus of West Indian Palms, the species differing widely in general appearance; not particularly ornamental, but a few of the recent introductions are worthy of cultivation. **T. argentea,** the Silver Thatch-palm of Jamaica, is an old and well-known species, having large, fan-shaped leaves; **T. graminifolia,** has slender, grass-like leaves: **T. elegans** and **T. Barbadensis** are the most ornamental of the species; **T. glauca,** and **parviflora** are also worth cultivating.

Verschaffeltia.

This genus is represented by two species, introduced from the Seychelles Islands; both handsome and distinct palms. The species known as **Regelia Majestica** is one of the finest ornaments in a palm collection. **V. splendida (R. princeps),** is a dwarf, slender plant and well worth a place in any collection.

Plectocomia.

P. Assamica.—A climbing palm, much resembling the cane (**Calamus**), and armed with formidable spines and long whip-like tails, to which are attached claws to enable it to hold on to other trees upon which it supports itself. It is a native of the Assam hills. Not particularly ornamental.

Desmoncus.

A genus closely resembling **Plectocomia** in appearanee, habit and general characteristics. They inhabit tropical South America. **D. major** is sometimes admitted into the grass conservatory.

CYCADACEÆ.

Cycas.

A genus of plants of great beauty, especially when young, with large, fan-like leaves radiating from the stem, and forming a complete circle. They are of very slow growth, and easily propagated by suckers, which they throw up in large numbers during the rains. **C. revoluta,** a native of Japan, is now naturalized in this country, and is one of the commonest plants to be met with in Indian gardens. It is at its greatest beauty in March and April, when it unfolds its new set of leaves; **C. circinalis** is of more prostrate growth, with longer leaves of polished light green; **C. Rumphii** is of larger growth, and handsomer than the two preceding; **C. sphœrica** differs a good deal from the others; **C. media** is a later introduction from New Holland, with a stout, tall cylindrical stem, having a magnificent head of leaves, of large size and variable form and character in different specimens. This is by far the handsomest of the Cycas species. All of them grow well in grass conservatories, and are striking ornaments therein.

Zamia.

A very handsome genus of Cycads, differing very little from Cycas in general appearance, except that their leaves are more feathery and fern-like. They are distinguished from Cycas by the leaf-stalks having the appearance of growing out in a tuft from the summit of the stem. There are several species in cultivation, notable among them being **Z. integrifolia, furfuracea and Lindenii.** Some are natives of Central America; others again come from the West Indies, the Cape of Good Hope, and South-Eastern Africa, where they form conspicuous objects in the vegetation. They are difficult to propagate, and must invariably be imported; but grow well in our grass conservatories.

Macrozamia.

These are closely allied to the preceding, are very handsome, and natives of Queensland, Australia, where they grow in swampy localities in the vicinity of the sea. The two most beautiful species are **M. Mackenzii** and **plumosa**. **M. cylindrica** is also a fine species; while **M. Denisoni** and **Miquela** are the more common species. They all love moisture, and can be successfully grown in grass conservatories; but are very difficult to propagate, and must always be imported.

BROMELIACEÆ.

Ananassa.

These are the ornamental-leaved Pine-apples. **A. sativa striatifolia,** the stripe-leaved Pine-apple, is a native of Malacca, and well known in our gardens for its beautiful leaves, which are marked longitudinally with stripes of primrose, red, and deep green. Well suited for pot culture, in a soil composed of leaf-mould sand, mixed with cocoanut fibre and charcoal. Propagated by division during the rains. **A. sativa variegata** is also a handsome plant; while **A. Portiana,** a recent introduction, is the handsomest of all.

Æchmea.

A genus of handsome leaved plants, having strap-formed, undulating, clasping leaves, which bear in August and September, compound spikes of bead-like buds, expanding into unpretending flowers Cultivation same as Ananassa. The two following are in cultivation. **Æ. fulgens,** having broad, thick leaves and flower stems; bears buds of a coral-crimson throughout.

Æ. discolor, a plant of slender growth, with flower buds tipped with dark purple, and having very much the appearance of the seeds of Abrus precatorius.

Bilbergia.

Dwarf, ornamental plants, with thick, succulent, aloe-like clasping leaves, natives of tropical South America, where they are often found growing on trees, thus showing their epiphytic character. In this country, however, they are generally grown in pots, in a soil similar to that recommended for Ananassa. I have also grown them successfully attached to blocks of wood, and suspended from the roof of the grass conservatory. The following varieties are in cultivation:—**B.**

bicolor; **tricolor**, **vittata**; **melanantha**; **pyramidalis**; **ferniosa**; **Leopoldii**; **Moreliana**; **oleus**; **Saundersii**; **thyrsoidea**; and **zonata**.

Tillandsia.

A genus of tropical American plants of dwarf growth, very similar in general appearance and character to the preceding, and epiphytal in habit, many of the species being found growing on trees. They are remarkable chiefly for their leaves, which are of varied colours. If attached to blocks of wood with moss, and kept moist, they thrive to perfection; they may also be grown in pots, and treated in the same way as Bilbergias. **T. musaica** is perhaps the handsomest species in cultivation, but being a recent introduction, is rather a rarity yet in this country. The following are some of the best species in cultivation:—**T. Kingiana**; **Lindenii**; **splendens**; **zebrina** and **zonata**. **T. utriculata**, native of Jamaica, is regarded as a traveller's plant, having pitchers of water which are tapped by thirsty wayfarers. Some of the other species, *e. g.*, **T. usneoides**, present a curious object, resembling tufts of hair hanging from the branches of trees in Central America. Propagated by offshoots and suckers which are thrown up during the rains.

Pitcairnia.

A genus of plants with sedge-like leaves, bearing during the hot and rainy seasons handsome racemes of large tubular brilliant crimson flowers. Not particular as to soil, though that recommended for Ananassa suits them best. Multiplied to any extent by division.

1. **P. bromeliæfolia.**—The largest growing plant of all, and best adapted to the open border; conspicuous for the white, mealy appearance of the under-surface of the leaves.

2. **P. Olfersii.**—Has broad leaves, and is in most respects similar to the preceding.

3. **P. punicea.**—A much smaller plant, and preferable to all perhaps for the size of the flowers and the compactness of the racemes.

4. **P. integrifolia.**—Has narrow leaves without spines on their edge as those of other species have. The racemes of flowers are long, lax, and diffuse, and consequently not so handsome as in some other species. 5. **P. fruticosa.**

6. **P. latifolia.**—Described as producing a bunch of from fifty to sixty flowers of a dazzling red.

7. **P. Altensteinii.**—Said to bear a thick short flower-stalk, supporting long tubular yellowish-white flowers, contrasting finely with their dazzling crimson velvet bracts.

8. **P. platyphylla**, a recent introduction.

AMARYLLIDACEÆ.

A very numerous order of bulbus plants, most of which at different periods appear to have been introduced into this country, though but a very limited number have long survived. Some have proved unsuited to the climate, and soon perished. Some have continued to thrive for many years, but without ever producing a flower, and so at last have become neglected and lost. Some few are indigenous to this country, and these blossom beautifully each season without any especial care being required in their cultivation. Those that are natives of the Cape of Good Hope almost all fail of blossoming here; and the trouble and expense of importing them to grow near Calcutta is uniformly attended with ill-success and disappointment. They succeed much better in the North-West Provinces; while on the hills they grow to perfection in a hot house.

Galanthus.

G. nivalis.—SNOWDROP.—Is only mentioned to state that though the corms may easily be procured in a perfectly sound condition from Europe, there is not the remotest chance of their ever producing flowers here on the plains; though they succeed very well on the hills.

Leucojum.

L. æstivum—SNOW-FLAKE.—Bears flowers very similar to those of the Snowdrop. Dr. Voigt mentions that it blossoms here in the hot season. I have not seen it.

Amaryllis.

A genus of beautiful bulbous plants, thriving to perfection in this country. They have come into popular favour recently, and scores of new varieties of all shades of colour have been raised by hybridization. They are very easy of culture, requiring no trouble after being once planted. In December and January the bulbs should be put into fresh soil, made up of well-decayed cow-dung, leaf-mould, sand and common garden loam, when they should be lightly watered. As soon as they begin their growths, water copiously, and they will be in full bloom in March and April. On the hills re-pot in March. As soon as they are done flowering, the pots shold be removed to a spare corner, where the plants can complete their growth. During the rains the bulbs may be divided and potted off separately. In lower Bengal the plants do not die down during the winter; but they do in Upper India and on the hills. Therefore, in the two latter cases, after the plants have finished their

growth, they should be allowed to die down by withholding water gradually.

A. Belladonna.—THE BELLADONNA LILY, is the typical species, and common in Indian gardens.

A. Josephinæ.—Is from the Cape of Good Hope, whence many of the varieties come.

It would be tedious to give a list of the hybrid varieties, of which there are over a hundred enumerated in the catalogues of English and Indian Nurserymen; but the following may be mentioned as particularly handsome and striking:—**reticulata**; **Mrs. Garfield**; **Mrs. W. Lee**; **Empress of India**; **Dr. Masters**; **Countess of Dufferin**; **Colonel Burnaby**; **Clarinda**; **Fairy Queen**, and **Othello**.

Zephryanthes.

SWAMP-LILY.

Small plants bearing, when in full leaf, during the rains, beautiful lily-like flowers, one on a scape. A mark should be set in the border where they are grown, or they are liable to be destroyed on the ground being dug up when they are out of leaf.

1. **Z. carinata.**—Has narrow grass-like leaves, and bears large rose-coloured flowers.

2. **Z. rosea**—Has flowers very similar to, but smaller than, the last.

3. **Z. tubispatha.**—Bears pure white flowers, not unlike those of a Crocus.

Habranthus.

A genus of plants producing flowers very similar to those of the preceding, and succeeding well here, as many as seven species being enumerated which blossom during the rains. Any soil suits them; but a light rich one the best.

Sprekelia.

1. **S. formosissima**—JACOBÆA LILY.—Produces large, beautiful, curiously-formed brilliant crimson flowers, without tube, borne vertically upon the scape in the manner of a cockade; a very common plant in the gardens at Ootacamund, and not uncommon grown in pots in Calcutta, where it blossoms in the hot and rainy seasons. On the hills it loses its leaves in the cold weather, as it does in Europe; but on the plains it retains them all the year through. The plants, however, would possibly blossom better if, by withholding

water and by exposure to the sun, they were brought for some time into a dormant state. Mrs. Loudon says that the bulbs will flower beautifully, merely covered with damp moss and suspended.

2. **S. Dalhousieæ.**—Has much broader leaves than the last, and bears in April pure white flowers with long narrow petals, of not much beauty. Both the foregoing should be repotted in fresh soil, made up of well-decayed cowdung leaf-mould, sand and garden loam, in February and March, both on the plains and the hills.

Hippeastrum.

KNIGHT'S STAR-LILY.

Large bulbous plants (often set down in catalogues under the name of Amaryllis) with long strap-formed leaves, which die down in the cold weather, and do not appear again till after the plants have flowered in March. The flowers, borne generally five in an umbel, on a scape about fourteen inches long, are large, of Lily form, with the jointed divisions of the corolla deeply coloured in such a way as when looked into to present the appearance of a star. The difference between many of them is very trifling. Nearly all thrive to perfection in this country. Dr. Voigt states that in Dr. Carey's garden at Serampore there were formerly as many as seventy-four crosses and hybrids, appearing in all their beauty during the hot and first part of the rain season. They may be grown in very large pots, but are the better for being planted out in beds devoted entirely to them. They require little care in their cultivation; but removal into a fresh situation every two or three years is beneficial. A light rich soil brings them to perfection.

1. **H. fulgidum.** 2. **H. reticulatum.** 3. **H. equestre majus.** 4. **H. stylosum.**—Are common in the Calcutta gardens, and bear flowers very similar to each other, with the limb of the corolla scarlet upon a greenish-white tube.

5. **H. ambiguum.**—With flowers nearly white.

6. **H. Johnsonii.**—A very handsome and distinct hybrid, with the segments of the corolla deep crimson, and the tube white.

Vallota.

V. purpurea.—A Cape bulb; bears, when the plant is in full leaf, flowers of a brilliant scarlet, similar in form to those of the Hippeastrum. It is a shy bloomer in this country, and treated more as a perennial.

Lycoris.

This bulb is now included under Amaryllis, and should be treated similarly.

1. **L. aurea.**—Native of China; bears an umbel of several large golden-yellow flowers, somewhat of a Lily form, in August and September.

2. **L. radiata.**—Native of Japan; produces in August and September large dull crimson flowers.

Nerine.

A large genus of Cape bulbs, including N. Sarniensis, the Guernsey Lily, bearing umbels of beautiful flowers, with their corollas divided into narrow wavy segments. None, I believe, have been found to blossom in the vicinity of Calcutta. They succeed better in Upper India. Should be treated in the same way as Amaryllis.

Crinum.

Dr. Voigt in his catalogue enumerates as many as thirty-three species of this genus, exclusive of varieties, besides thirty hybrids and crosses, as cultivated in the gardens at Serampore, and nearly all blossoming in the rain season. A large portion probably of these are not to be met with now either there or in any other garden about Calcutta. Indeed, between most of them there is so great a similarity that all but a limited few may be dispensed with in any but a botanical garden. They are almost all natives of this country, and perfectly hardy, needing no particular care or attention after being once planted. A rich soil, however, suits them. Can be increased to any extent by separating bulbs at the beginning of the hot season when they should be repotted.

1. **C. amœnum.**—Native of Sylhet, in muddy creeks; has narrow leaves a foot or two long; bears in April and May, a scape about a foot long, with an umbel of four to six large white flowers.

2. **C. defixum**—*Sook-durshun.*—Has very narrow leaves from one to three feet long. Scape with umbel of six to sixteen large white flowers, very fragrant, especially at night.

3. **C. brevifolium.**—Native of Mauritius; leaves lanceolar, broad; bears in the hot and rain seasons scapes with ten to twelve large white, faintly-fragrant flowers.

4. **C. longifolium.**—Native of Bengal swamps; leaves two to three feet long; scapes with eight to twelve large white fragrant flowers. A common species, found in nearly every garden; blossoms during the rains. If, when the first flower of the umbel

opens, the scape be cut and brought into the house and put into a glass of water, the remaining flowers will continue opening in succession for several days, scenting the rooms, particularly at night, with their most delicious odour.

5. **C. lorifolium.**—Native of Pegu; bears at the close of the rains umbels of twenty large white fragrant flowers.

6. **C. Sumatranum.**—Bears at various seasons scapes with umbels of from ten to twenty large white fragrant flowers.

7. **C. canaliculatum.**—Leaves from three to five feet long, and three to four inches broad; scapes about two feet long, bearing umbels of about forty middling-sized, pure white, long-pedicled, sweetly fragrant flowers.

8. **C. latifolium.**—Native of Bengal; leaves one to three feet long, and three to five inches broad; bears a scape one to two feet long with large pale-rose faintly fragrant flowers, in the rains. A plant of immense size, with nothing corresponding to recommend it.

9. **C. Zeylanicum.**—Bears flowers almost exactly the same as the last.

10 **C. superbum.**—Native of Sumatra; root of many fleshy ramous fibres, with scarcely any appearance of a bulb. Stem short, from twelve to eighteen inches high, and as thick as a man's leg or more; scape about three or four feet long, bearing umbels of from twenty to thirty very long pedicled, rose-coloured, delightfully fragrant flowers. Dr. Roxburgh says:—

"It thrives luxuriantly in the Calcutta Botanical Gardens, and is the largest and by far the most beautiful species of Crinum I have yet met with; and if the fragrance of its numerous large flowers is taken into account, it is probably the most desirable of all the tribe."

11. **C. Asiaticum toxicarium.**—Leaves from three to four feet long, and from five to seven inches broad; scape bears umbels of as many as fifty large white, nearly scentless flowers. Dr. Roxburgh says: "Its immense large, beautiful, smooth, deep-green leaves make it conspicuous and desirable in the flower-garden."

12. **C. augustum.**—Dr. Roxburgh states:—

"This magnificent plant from the Mauritius has been introduced into the Calcutta Botanical Gardens, where it blossoms at various times throughout the year, but with the greatest luxuriance during the rains; the scapes are as thick as a child's wrist, above three feet long, and of a dark reddish-purple colour. The umbels bear about thirty, sweetly fragrant, rosy flowers, on pedicles from one to two inches long, and coloured like the scape."

13. **C. scabrum.**—A small plant; bears in March umbels of about five erect dingy-white flowers.

14. **C. Verschaffeltianum.**—Is a recent introduction, and a magnificent plant with immense sword-like leaves, and reminding one of a huge Dracœna.

15. **C. Macowenii.**—Also a new plant of splendid appearance.

16. **C. Sanderianum.**—From Sierra Leone; is a distinct and beautiful new species, with white flowers having bands of crimson down the centre.

Hæmanthus.

The several species of this genus are natives of the Cape. Dr. Voigt enumerates four species introduced into this country, which he says had not flowered. They all love a rich soil, and should be repotted in February on the plains, and in March and April on the hills.

H. virescens: *var.* **Albiflos.**—Mrs. Loudon says: "This certainly has no pretensions to be considered ornamental at all." But, in my opinion, its small size and neat ciliated leaves render it a far more desirable plant than many of the Crinums, the flowers of which its own much resemble. A most hardy plant, outliving almost any treatment. Two bulbs I brought from the Cape, and had in my possession six years, only blossomed once during the time, and that was in August, after exposure to very heavy rain. Mr. Villet states that it requires a moist light soil. No doubt it should be encouraged to become dormant in the cold months.

During recent years some beautiful varieties have been introduced, amongst which **H. Kalbreyeri** stands foremost, with its immense head of flowers of a bright vermilion colour. A single head produces over a hundred blooms. **H. albomaculatus; Cinnabarium; hirsutum** and **Mannii** are also very attractive.

Cyrtanthus.

A genus of very handsome Cape bulbs; rarely, if ever, blossoming here. I have only seen one species in bloom, **C. Bruckerii**, but others might be introduced with advantage. Same treatment as the preceding.

Eurycles.

E. Amboinensis.—A large bulbous plant; native of Amboyna, not uncommon in the gardens of Calcutta. Grown in a large pot; its principal point of ornament is its large, handsome, roundish, cordate folding leaves. Bears in May and June scapes with a head of several white middling-sized flowers. Mrs. Loudon says: "It possesses the curious property of the seeds germinating in the capsule, and even producing small bulbs there, which protrude themselves as soon as the capsule becomes sufficiently ripe to burst." In small or weakly plants the leaves die down in the cold season, and do not appear again till late the following hot season. In repotting the bulb care

should be taken not to injure the large thick fibrous roots, or it will be much retarded in its after growth. **E. Australasica** and **Cunninghamii** are later introductions of much beauty.

Eucharis.

E. Amazonica.—An exceedingly handsome plant, native of Brazil, and quite naturalized in this country, with large ovate-lanceolate leaves a foot and a half long, of a fine deep green. Sends up in the cold months a scape bearing five to seven large pure-white sweet-scented flowers; propagated easily by separation of the bulbs in October. It requires abundance of water, and a rich soil.

E. Candida.—A recent introduction from the United States of Columbia, with broadly elliptic acuminate curved leaves, and an umbel bearing lovely sweet-scented flowers, of a chaste waxy whiteness. A very desirable variety. **E. Saundersii**, also a recent introduction from the same locality as the last. It is a somewhat distinct variety, bearing umbels of beautiful snow-white, sweet-scented flowers, having the corona marked with yellow stripes. **E. Mastersii** is the latest acquisition, claiming the same native country as the two preceding. Bears a scape of deliciously fragrant flowers of the most snowy whiteness; the free portion of the staminal cup, or corona, forms a narrow but united collar-like rim to the perianth tube. **E. Pumila** is a small-flowered variety, and a very desirable pot plant. Bears white flowers of a delicious delicate fragrance.

All the above must be grown under glass on the hills.

Pancratium.

SEA-DAFFODIL.

A genus of bulbous plants, bearing large white bell-form fugitive flowers. Require no care in cultivation. The bulbs once put down, come up as a matter of course the following year, if left undisturbed.

1. **P. Zeylanicum.**—A common plant; grows in the border of most gardens; bears solitary flowers of feeble but agreeable fragrance, which generally open in the evening after heavy rain.

2. **P. fragrans.**—Differs little from the preceding.

3. **P. maritimum.**—Well known as a native of the sands on the shores of the Mediterranean; is mentioned by Dr. Voigt as blossoming here in the rains.

Hymenocallis.

A genus of handsome West Indian bulbs, containing many species. Easy of culture. Treatment same as Eucharis.

H. speciosa.—An elegant plant, with handsome foliage of thick wide leaves; flowers borne upon short scapes in large dense heads, pleasingly fragrant like those of the Petunia; blossoms in December.

Ismene.

I. calathina—PERUVIAN DAFFODIL.—A plant of no great merit; bears in May flowers similar to those of Pancratium, white, solitary, very fragrant. Like Eurycles, said to have the property of producing bulbs in the capsules.

Narcissus.

The numerous species and varieties of this well-known genus known under the name of **Polyanthus Narcissus**, thrive and blossom to perfection in the North-West Provinces, the Punjab, and other parts of upper India; while on the hills many of the species are found growing in a wild state, and blooming in great profusion, especially in the valleys. But in the vicinity of Calcutta their cultivation is rarely, if ever, attended with satisfaction. Dr. Voigt states, that out of thirty-five species which had been introduced into the Serampore Garden during a period of seventeen years, only one had flowered, and continued to do so. When residing at Howrah I procured from England a large quantity of bulbs of the different sorts, and though they reached me in the seasonable month of October in sound and excellent condition, few blossomed at all, and those that did, produced but the very poorest flowers. No better success has attended the cultivation of those which have been brought down from the Hills.

They require a light soil of vegetable mould and decayed cow-manure loosened with sand. The bulbs should be planted three inches deep; the larger ones singly, and the smaller, such as Jonquils and Hoop-petticoats, three in a pot. They need little or no water till they have well started, and if they do not start as soon as might be expected, they must not be impatiently watered to induce them to do so, or they will be very likely to rot. Once in vigorous growth they require to be well watered continually till the leaves, turning colour, show that the bulbs are about returning to rest again. Water must then be gradually withholden, and when the leaves are dead, discontinued altogether. Catalogues of English and continental nurserymen contain lists of some scores of varieties; and a collection once obtained, should be preserved year after year. On the hills the bulbs should be started in the beginning of February.

1. **N. Jonquilla** — JONQUILL.—This is the only species I have had any success with near Calcutta. I procured bulbs from England some

years ago, and they have thriven and blossomed well every cold season since, with their small pretty bright-yellow flowers.

2. **N. Tazetta.**—Has white flowers with pale-yellow cup. Dr. Voigt states that this flowered, and continued to do so in the Serampore Garden. Treatment same as for the preceding.

Alstromeria.

A genus of curious and interesting plants, distinct from any of the preceding of this order in having, for the most part, fibrous roots without bulbs. Their leaves have the peculiarity of taking a twist just at their footstalks, and always presenting their under surface upwards. They are said to do best planted as deep as eight or ten inches in the soil.

2. **A. psittacina.**—Has clusters of bulb-like roots, and sends up stems about fourteen inches high, which produce in March flowers with their lower part of a vivid crimson and the ends of the petals of leaf-green colour. I brought down plants of this species from Ootacamund, which have thriven well and blossomed yearly ever since.

Clivia.

1. **C. nobilis,** and 2. **C. Gardeni** and 3. **C. Lindenii.**—Cape bulbous plants, bearing heads of beautiful tubular drooping flowers. The two first named have of late been introduced under the name of **Imontaphyllum cyrtanthifolium** and **I. miniatum,** which thrive very well in our grass conservatories. Should be started in November, in light rich soil. On the hills start in February.

Agave.

Plants with large, fleshy, thorny-edged leaves, producing greenish unattractive flowers. **A. bulbosa** is of late introduction.

A. Americana variegata—AMERICAN ALOE.—Leaves creamy white, striped with green; has a noble aspect grown on a lawn where there is plenty of room; delights in brick rubbish in which abundance of leaf-mould is incorporated.

Fourcroya.

F. Cantala.—Often employed as a hedge, its thorny leaves rendering it an impenetrable barrier; being of comparatively ow growh, it has the advantage of not impeding the view or screening off the air. Not fit for any thing else.

IRIDACEÆ.

Nearly all of this order are bulbous or rhizomatous plants; many natives of the Cape of Good Hope, the cultivation of which in Bengal is for the most part rarely attended with success. It is not worth while to mention many more than what are known to thrive and blossom satisfactorily here.

Cipura, *syn.* Marica.

Plants much resembling the Iris in regard to both flowers and leaves. The fugitiveness of their flowers is their great detraction.

1. **C. Northiana.**—Bears in the hot months large delicate yellow flowers. After flowering the flower-stem bends downwards till its summit touches the ground, where it rests, and eventually throws out roots, thus forming an independent plant. When grown in a pot it is easily propagated by placing a pot by the side filled with light sandy soil, into which the flower-stalk may be bent down.

2. **C. humilis.**—A small pot-plant; bears in March pretty middling-sized flowers with blue petals, yellow in the centre.

3. **C. plicata.**—A small plant with grass-like leaves; does well planted out in the border. Upon the sun going down during the hot months, it bursts into a profusion of blossom with surprising suddenness, and looks remarkably pretty, bearing white flowers of the size of a shilling.

Iris.

Dr. Voigt enumerates as many as thirty-six species introduced into Bengal, a very small number of which probably are in existence there now. Not more than two or three are worth cultivating, as the rest seldom if ever blossom. The bulbs should be started in October on the plains, and in February on the hills. The two first named are evergreen in this country, and common in our gardens.

1 **I. Chinensis.**—Bears in February and March large, pale, violet-blue flowers, pencilled with yellow; a common plant in gardens in all parts of India, but seems to blossom far more freely in the North-West Provinces than in the locality of Bengal.

2. **I. Nepalensis.**—Bears in February bright azure-blue flowers.

3. **I. Susiana**—CHALCEDONIAN or WIDOW IRIS.—"Whose large flowers," Mr. Delamer remarks, "marbled or veined with a dull-greyish purple-brown suggest the idea of the hues of mourning." When at Ferozepore I procured from England rhizomes of this plant, which throve and blossomed beautifully. I obtained plants also at Howrah, but had no success with them there. Requires a light and rich soil, but much moisture is said to be injurious to it.

4. **I. Persica**—PERSIAN IRIS.—A small bulbous plant, bears pale blue flowers of delightful fragrance; requires a light sandy soil, and is impatient of wet. I have imported bulbs of this plant, but had no success with them.

5. **I. xiphium**—SPANISH IRIS: and

6. **I. xiphioides**—ENGLISH IRIS.—Bulbous plants with grass-like leaves. Of these there is a vast number of varieties cultivated in the gardens in England. They do not bear being kept long out of the ground. Of a large assortment I procured when at Ferozepore, though apparently perfectly sound, not a single one started, but remained for months in their pots, till they eventually perished. Of a collection I imported at Howrah all came up pretty well, and many flowered, but not at all satisfactorily.

7. **I. moræoides.**—Thrives and blossoms well in Calcutta, bearing very beautiful white flowers in the hot season.

Tigridia.

T. Pavonia.—TIGER-FLOWER.—A large bulbous plant; bears great gorgeous but most fugitive flowers, with bright scarlet petals, and the centre spotted like a leopard's skin. It blossoms here in July and August. It thrives well in Upper India and in Ootacamund, where it is met with in abundance. The bulbs should be started in March and April, both on the hills and on the plains.

Pardanthus.

P. Chinensis.—LEOPARD-FLOWER.—An herbaceous plant with Iris-like leaves; bears during the rains an upright stalk two feet high, and upon its summit several middling-sized dull orange-coloured flowers with scarlet spots; a common plant in all gardens in India.

Babiana.

A numerous genus of Cape small bulbous plants, bearing middling-sized beautiful flowers, but not cultivated here, I believe, with any success.

Gladiolus.

SWORD-FLAG.

A genus of bulbous plants bearing brilliant lovely flowers of varied hues; the number of hybrids and vareties that have been raised by cultivators in Europe is almost endless. It is one of the few Cape bulbs of the order which thrive to satisfaction in this country; and a selection of good varieties once procured may be preserved with little

difficulty from year to year. They may be planted either in pots or in the open ground towards the end of October on the plains, and in March on the hills, where they come to great perfection. They require a soil principally of sandy leaf-mould. They should be planted as much as six inches deep, otherwise the new corm which forms above the old one is apt to push above ground. It is recommended to put a layer of sand an inch thick over the corm when planted. They blossom in March on the planes, and from July to September on the hills. After flowering the leaves gradually die down, and then the pots with the dormant corms should be put in some place where they may remain dry till the time comes round to pot them afresh. They are two divisions, **Gandavensis** and, **Brenchleyensis**, the latter being mostly vivid scarlet, but differing little from each other in general appearance.

Sparaxis.

A genus of Cape bulbous plants of small size, bearing abundant flowers of great beauty. Some four or five are mentioned by Dr. Voigt as succeeding in this country and blossoming in February and March. The cultivation of them is much the same as that of the Gladiolus. The following are given as the finest :

1. **S. lineata.**—Flowers white with pale-green eye, clouded with black. 2. **S.—grandiflora.**—Flowers purple with white rim ; of extraordinary beauty. 3. **S. tricolor.**—Flowers very large ; orange and yellow. English seedsmen's catologues contain lists of many varieties, and a collection once imported can be kept up and increased every year.

Ixia.

Cape bulbous plants, between which and last there is but a slight botanical difference. The cultivation is the same. Some succeed and flower well in this country. Those considered finest are :—1. **I. Helleni**. 2. **I. flexuosa.**—Flowers white, rosy-striped. 3. **I. viridiflora.**—Flowers, green, star-formed, with purple eye. 4. **I. Trichonema rosea**. There are many more beautiful varieties mentioned in the catalogues of English seedsmen.

Crocus.

The cultivation of the English Crocus has not been attended with success in this country on the plains ; but on the hills they succeed admirably. Put down the bulbs in February on the hills, and in October on the plains.

C. sativus—SAFFRON.—*Zāfrān.*—Of this very beautiful species I obtained bulbs from a friend brought from Cashmir, which blossomed to perfection in my garden at Ferozepore.

MUSACEÆ.

Heliconia.

A genus of handsome-leaved plants, natives of tropical America, and forming fine bushes or clumps. They have something of the appearance of the Plantain, with their cool, refreshing leaves. They are very easy of culture, but require a somewhat rich soil, with plenty of moisture, to bring them to perfection. Propagated easily by division during the rains. The following are among the most ornamental species :—

1. **H. Buccinata.** Native of Amboyna, with rigid, erect-growing leaves, and protuberant ribs; a very ornamental plant, and an old favourite.

2. **H. Aureo-striata.**—From the South Sea Islands, one of the best the leaves being striped horizontally with streaks of gold.

3. **H. metallica,** with leaves of bronze colour, and having a beautiful metallic appearance.

4. **H. Stricta-rosea,** an erect growing plant, with leaves of a beautiful green, and with a decided rosy tint.

5. **H. triumphans,** a recently introduced plant of noble aspect, with bright green leaves striped with greenish black, and of very much the aspect of Maranta Zebrina ; native of Sumatra.

6. **H. Urendi,** an old favorite, and a handsome ornament of the plant house.

Strelitzia.

A genus of plants natives of the Cape, held in the highest estimation in Europe for what are considered their gorgeous flowers. Cultivation same as for Heliconia.

1. **S. angustifolia.**—An uninteresting plant with narrow, rush-like leaves.

2. **S. reginæ.**—Accounted a magnificent plant in Europe, for its shapeless flowers, in my opinion more singular than beautiful, having their sepals resembling so many orange-coloured splints of different forms, bundled together with two arrow-headed deep-purple petals, and projecting from a narrow spathe six inches long. Most readily raised by seed, obtained through impregnating the stigma when the plant is in flower.

Urania.

U. speciosa, *syn.* **Ravenala Madagascarensis**—TRAVELLER'S TREE.—The following is a condensed description of this plant as given by Mr. Ellis :—

" The tree rises from the ground with a thick succulent stem, from the centre of which it sends out long, broad leaves like those of the

Plantain, only less fragile, and rising not round the stalk, but in two lines on opposite sides. The tree presents the appearance of a large open fan. Many of the trees are at least thirty feet from the ground to the lowest leaves. I frequently counted from twenty to twenty-four leaves on a single tree, the stalk of each leaf being six or eight feet long, and the broad leaf itself four or six feet more.

"This tree has been most celebrated for containing, even during the most arid season, a large quantity of pure fresh water in the thick firm ends of the stalks of the leaves, supplying to the traveller the place of wells in the desert."*

It is a common plant in gardens about Calcutta. Easily propagated by division.

ZINGIBERACEÆ.

Globba.

Few of the species of this genus are of much importance in a decorative point of view. Cultivated in the same way as the common ginger.

1. **G. subulata.**—Native of Chittagong,—

"Blossoms," Dr. Roxburgh says, "during the hot season, with a constant succession of flowers from the extremities of the lengthening branches of the panicles for nearly two months; which renders this lovely plant one of the most charming of the whole order I have yet met with. Flowers small, beautifully purple, with the lip deep orange-yellow."

2. **G. spathulata.**—Native of Sylhet; described by Dr. Roxburgh as a beautiful species, with large azure-coloured radical inflorescence; blossoms in April, when the foliage appears. At the beginning of the cold season it perishes down to the root.

Curcuma.

TURMERIC.

A numerous genus of plants with ginger-like roots, sending up naked from the ground, about nine or ten inches high, thick spikes of flowers, the principal beauty of which consists in the large, gorgeous-coloured bracts. There is a great sameness between many of the species. The following are perhaps those most deserving of cultivation:—

1. **C. Zerumbet.**—LONG ZEDOARY.—Bears in April, before the leaves make their appearance, flower-spikes with the terminal tufts of

* Madagascar, p. 302.

barren tracts, contrasting prettily with the pale-yellow and green of the lower the fertile ones. Leaves large, lanceolate, and handsome; fragrant when bruised.

2. **C. Roscœana.**—Native of Pegu, and common in Calcutta. Sir J. Paxton's description of this plant is :—

"Floral envelopes gorgeous scarlet : blossoms yellow : continues in flower more than two months without beginning to fade. Plants kept in dull situations flower feebly, and are pale and dingy. It requires strong solar light to elicit the scarlet colour of its blossoms. A plant of dwarf habitude and noble foliage."

3. **C. comosa.**— Native of Burmah. Dr. Roxburgh says of this species :—

"By far the most beautiful and the largest of the genus I have seen : bears in May, before the appearance of the leaves, short-scaped, large, clavate spikes, with the fertile bracts of a beautiful pale pink, and the barren ones of a lovely rosy red."

4. **C. Zedoaria**—WILD TURMERIC — RED ZEDOARY. — Native of Bengal : common in gardens about Calcutta. Scape rises before the leaves in the hot season as thick as a man's forefinger, bearing beautiful large, rosy, tufted spikes. Dr. Roxburgh says :—

"This plant, when in flower, is highly ornamental, few surpassing it in beauty ; at the same time it possesses a considerable degree of delicate aromatic fragrance."

Kæmpferia.

A genus containing several species of tuberous-rooted plants, the pretty delicate flowers of which are produced so close to the ground that unless the plants are grown in pots they are lost to sight. Their leaves die down in the cold weather, when the roots may be separated and repotted in a light good soil. The two following, which are very common, are met with generally in the gardens in India.

1. **K. rotunda.**—*Bhooin-chumpa.*—A plant with large oval-lanceolate leaves, which die down towards the end of November, and do not appear again till after the plant has finished flowering in April. Flowers, with two petals white and two deep lilac, of moderate size, borne not more than two or three inches from the ground, in a crowded manner, opening day by day in succession in the morning and fading by the evening, and diffusing a most exquisite fragrance.

2. **K. Galanga.**—Has roundish leaves of a beautiful refreshing green, overlapping each other, and lying flat upon the ground, and forming a delightful relief to the delicate flowers, which seem just to rest upon them. The flowers, of a pearly white with two purple spots, are borne throughtout the rains, and are quite scentless ; but the root, as well as the leaves, when bruised have a fine fragrance.

3. **K. sp.**—A very pretty species—is to be seen in the Calcutta Botanical Gardens—in all respects similar to the last, except that the flowers are entirely purple. Some of the newer varieties are. **K. Bensonœ**; **Gilbertii**; **Moulmeinensis**, a really handsome plant, **rosceana**, and **undulata**.

Hedychium.

As many as twenty-four species of this genus, all natives of Nepâl and the Khâssya Hills, are enumerated as growing in Bengal, but not more than some three or four of which appear to be known in the Calcutta gardens now. They all have ginger-like roots. Their stems, with their sheathing lanceolate leaves, die down partially in the cold weather, which is the proper time for separating the roots and planting them out in a well-manured soil. They are too large to be grown satisfactorily in pots.

1. **H. coronarium.**—GARLAND-FLOWER.—This is a very common plant, accounted the finest of all the species, and certainly one of the loveliest ornaments of the garden. The numerous stems, about three feet high, rise in succession during the rains, bearing on their summit dense bracteal heads of large pure white flowers, which emit a delightful fragrance, particularly of an evening, for a long distance around. Bears seed abundantly in the cold season.

There is a variety with yellow flowers.

2. **H. chrysoleucum.**—Bears flowers nearly of the same size as those of the last, described by Curtis as "very handsome, deliciously scented, of a pure white, bright orange in the disk, and the anthers and filaments a very deep orange."

3. **H. flavum.**—Dr. Roxburgh calls this a charming species, and says:—

"It differs from H. coronarium in regard to its flowers, which are about one-third smaller, and partake not only of the yellow colour of those of Michelia Champaca, but possess even their peculiar fragrance, only in a less powerful, and therefore more grateful, degree. In stature and leaves both species are alike. A native of Sylhet, and blossoms in the rains."

4. **H. angustifolium.**—Has very narrow leaves, and stems about three feet high; bears during the rains spikes of small, narrow-petalled, pale dirty-red, scentless flowers of little beauty.

Alpinia.

A genus of plants with large lanceolate leaves, some bearing very beautiful flowers. They soon overspread a large extent of ground, and

on that account, are apt to be rather troublesome in a garden. They can be multiplied to any extent by division of their rhizomatous or ginger-like roots.

1. **A. nutans.**—Bears drooping compound racemes, about a foot long, of very beautiful flowers, somewhat of the size and form of the Foxglove, with bracts and calyces of a pure pearly white, the edges of the flower tinged with pink, and the interior orange. In blossom most of the year. Thrives best in swampy ground. Grows to six feet high or more, and so soon extends over a large portion of ground, that it is unadapted for a small garden.

2. **A. Punicea.**—Native of Sumatra: a stately species; bears large flowers, of colour of the finest carmine, in the hot months.

3. **A. Malaccensis**—Native of Chittagong. Dr. Roxburgh's description of this species is,—

"That the leaves are lanceolate, about two or three feet long: flowers very large, pure smooth shining white, except the inner border or labium, which is a beautiful mixture of orange and crimson. The most beautiful of the whole genus, even surpassing A. nutans."

4. **A. Allughas.**—A common plant, Dr. Roxburgh says, near Calcutta, in low moist places among brushwood. Leaves lanceolate, polished. Flowers, beginning of the rain season, large, numerous in succession, of a beautiful rose colour, inodorous.

5. **A. mutica.**—Dr. Roxburgh describes this as bearing

"Large numerous drooping flowers at the beginning of the rains. Calyx longer than the corolla, pure white. Corolla-lip or inner border large, elegantly variegated with crimson and yellow, surrounded with an orange-coloured edging."

6. **A. calcarata.**—An interesting plant about three feet high, bears in the hot season rather large flowers, buff colour, striped with purple. The whole plant, though aromatic, has a strong smell of tallow.

7. **A. albo-lineata**, and 8. **A. Vittata** are recent introductions, and have striped and variegated leaves of a very ornamental character.

Costus.

1. **C. speciosus.**—Native of Bengal; a common plant, often met with growing wild in swampy places. When in blossom during the rains a most beautiful object. The dark rich green of the large lanceolate leaves, the deep crimson of the bracteal heads, which are as large as a man's closed hand, and the pale lavender-coloured flowers, full five inches across, form together a most delightful combination of colour. Cultivated in the same way as the common ginger.

2. **C. argyrophyllus.**—Bears during the rains large white flowers, but is of little merit as a garden plant.

3. **C. Amazonica** and 4. **C. Elegans**, are both ornamental plants, and well worthy of a place in a collection.

MARANTACEÆ.

Maranta.

An extensive genus of trophical plants, most of them remarkable for the highly ornamental character of their leaves. They are very easy of culture, and thrive to perfection in our grass conservatories, where they form quite a striking feature. The soil recommended for ferns suits them admirably. They love moisture and shade, and are at their best during the rains. The leaves die down generally in the winter. About the end of March on the hills, and February on the plains the tuberous roots should be taken out of the pots, and separated and planted out in separate pots, thus securing an additional number of plants. They must be grown as stove plants on the hills.

There are over fifty varieties in cultivation, all more or less ornamental leaved. The following are among the best :—**M. Albo-lineata; Asymmetrica; Bachemiana; bella; bicolor; Binotii; exima; fasciata; Hardingii; illustris; Kerchovei; Lindeni; Lowei; Lubersii; iconifera; nigro-costata; ornata; pennatopicta; Porteana; Prasina: princeps; pulchella; regalis; roseo-picta; sanguinea; Veitchii; virginalis; Wallisii; Wictii;** and **zebrina.** The foregoing will form as choice a collection as can be wished for. The following, which are also very ornamental, can be added if desired :—**M. albovittata; amabilis; bicolor; Chimboransis; cinerea; Goveana; Legrelliana; Leopardina; Leitzei; Makoyana; Massangiana; nitens; Oppenheimiana; porphyrocaulis; rubra; Seemanii; selosa; splendida; tubispatha; undulata; Vanden Hickie,** and **Warscewiczii.**

Phrynium.

P. dichotomum.—Native of Bengal, closely allied to, and resembling Calathea: a shrub four or five feet high; bears in the hot season very pretty and delicate white flowers of moderate size by twos on a stem, but not in sufficient number to relieve the dense mass of foliage. **P. villosatum** is also met with at Calcutta. Cultivation same as for Maranta.

Calathea.

A genus so closely allied to Maranta that the several species of each are often confounded. It contains many beautiful-leaved plants, which

succeed admirably in this country. In the Jardin des Plantes at Paris I noticed the following as especially beautiful: **C. picturata**; **C. micans**; **C. ornata picta**; **C. argyræa**; **C. eximia**; and **C. pulchella**.

1. **C. zebrina.**—ZEBRA-PLANT.—Native of Brazil: has been described as "one of the handsomest stove-plants in existence in respect to its foliage, which is large, velvety, and beautifully variegated with dark green and a paler tint." * Plants are to be met with in some of the gardens about Calcutta, but they certainly do not realise so favourable a description, the green upper surface of the leaf being of a dead hue, and the stripes, though distinct, not sharp and vivid. The lower surface of the leaf, which curls over partially from the base a short way upwards, is of a dull purple. It bears clumps of pale purple flowers, situated close upon the ground, about the beginning of the hot season.

2. **C. bicolor** and **C. Warscewiczii** are met with in Calcutta. **C. erecta** is very similar in appearance to Maranta Lindeni. Cultivation of all similar to that for Maranta.

Canna.

INDIAN SHOT.

Ukul-bhar.

A very numerous genus of handsome leaved plants, bearing brilliant flowers varying from yellow to deep-crimson. Between the several species there is so great a similarity of character as to make it needless to retain in the garden more than some two or three of the best. They all have large lanceolate leaves, grow from three to six feet high, and are apt to become exceedingly troublesome by throwing up suckers for a great distance around. Most easily propagated either by division of roots or by seed. They all love a rich soil, and plenty of moisture.

C. Annæi.—Bears robust stem more than six feet high, with numerous heads of large flowers, orange-yellow externally, and orange-red within; **C. gigantea**, with scarlet flowers, and **C. zebrina** are most worthy of cultivation. The following are in cultivation in this country:—

1. **C. Indica.**—The well-known species, native of India, and found almost everywhere, constantly in blossom, with its small but vivid crimson-scarlet flowers.

2. *Var* **lutea.**—A variety with yellow flowers.

3. **C. Roscœana.**—Has orange-coloured flowers, spotted and striped with crimson.

4. **C. edulis.**—Has small crimson flowers, with the lower lip striped.

5. **C. Achiraa.**—Has also crimson-scarlet flowers.

* 'Glenny's Handbook to the Flower Garden,' p. 61.

6. **C. Schuberttii.**—Has crimson-scarlet flowers, somewhat larger than any of the preceding.

7. **C. glauca.**—Has narrow glaucous-green leaves, and bears rather large, pale, lemon-yellow flowers.

8. **C. Warscewiczii.**—This is beyond comparison the most beautiful of any of the species met with in India; bears brilliant crimson flowers, admirably set off by the stems, which are of a rich chocolate-brown, as well as by the leaves, which are striped and edged with the same colour.

9. **C. discolor.**—Has large crimson flowers, with the leaves and stems somewhat similar to the last, but not so handsome.

10. **C. flaccida.**—This is a most beautiful plant, totally distinct from all the other species in the size and form of its flowers, which are of a bright yellow, and as large as those of an Iris.

Besides the foregoing I find in Dr. Anderson's catalogue, **C. crenulata**; **C. Cubensis**; **C. diversicolor**; **C. esculenta**; **C. Lagunensis**; **C. Lamberti**; and **C. limbata**, a species said to be "above all, remarkable for its very large petal-like stamens of a lively scarlet-red, with the borders of the limb surrounded with a golden yellow band."* To these may now be added some thirty named kinds raised from seed.

ORCHIDACEÆ.

ORCHIDS.

This is a genus of plants of such varied form, colour, and growth; and so widely distributed over the face of the earth, that it is no easy task to lay down hard-and-fast rules for their cultivation. They have, however, risen in popular favour to such an extent, and are held in such esteem for their lovely and fragrant flowers, which are remarkable no less for beauty and brilliancy and gorgeousness, than for their extraordinary form and shape, that it becomes an imperative duty to deal with the genus in considerable detail in a work such as this. More especially is this necessary now that orchids are more generally cultivated in this country than they used to be some ten or fifteen years ago. It will, however, be obvious that it would occupy fully one hundred pages were an attempt made here to deal with the subject exhaustively and enumerate every species in cultivation. Such a task must be left to be taken up separately in a work exclusively devoted to orchids, and by an abler pen than that of the reviser of this edition. It may however, be stated here that so far as it has been found practicable, nothing has been omitted which is at all essential for the purposes of successful cultivation of these remarkable plants.

* 'Le Bon Jardinier' pour 1866, p. 257.

Distribution of Species.—The natural home of the orchid is the tropical zone; some of the loveliest species come from the Khassya Hills, Nepal, Sikkhim, Bhutan, Assam, Burma, and Ceylon. In Lower Bengal many beautiful species are found growing in a wild state. In the Darjeeling, Terai, and on the lower ranges of the Eastern Himalayas they also abound. In Java, Sumatra, Borneo, and the Straits Settlements generally, they are also found in great numbers; while in South Africa they also form a striking feature of the vegetation of that region. But by far the greatest number of species, and of the most beautiful types, come to us from tropical South America, Mexico, and the West Indies.

Natural Conditions.—In their natural state orchids are found growing out of crevices of rocks, upon moss-grown situations, and upon the branches and trunks of trees; but as a rule in situations where humidity and shade abound. One or two of the species are partial to bright sunshine, without which they cannot be brought to thrive at all. But if there is one thing more than another which is fatal to their growth, it is *stagnant moisture*, from which they are singularly free in their natural habitats.

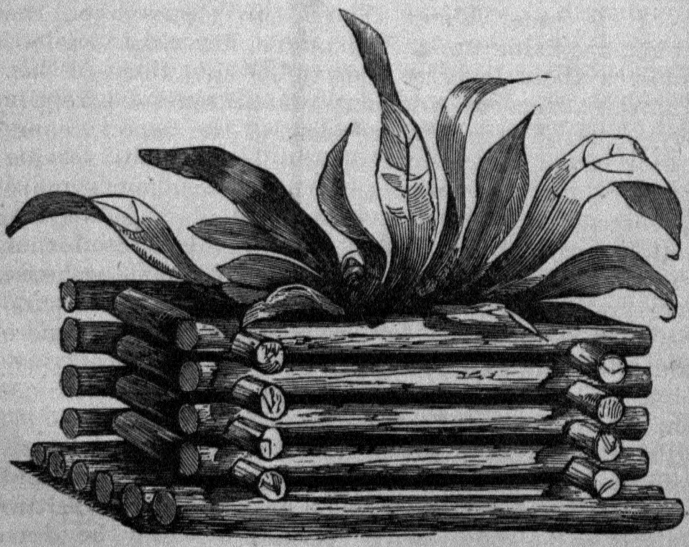
Division of Species.—Orchids are divided into two great divisions, *viz.*, terrestrial and celestial, or epiphytal. Terrestrial orchids are those which grow more or less in soil, and have their roots embedded in it; from which they absorb the nourishment necessary for their growth. Celestial, or epiphytal orchids comprise those which grow upon the trunks and branches of trees, having their roots exposed to the air, from which they imbibe all the nourishment requisite for their growth. This distinction between the two species must always be carefully considered in apportioning the treatment necessary for them. There is a notion prevalent that every orchid—because it is an orchid—must of necessity be tied on to a piece of wood. The result of such indiscriminate treatment is, in nine cases out of ten, failure. Others again, religiously pot off every thing in the shape of an orchid in soil that would not even grow a potato. Therefore, when an orchid has been obtained, the first point to ascertain is, whether it is a terrestrial or a celestial. This can easily be done. The former have fibrous roots, more or less; and the latter long, thick, fleshy roots, as a rule; the exceptions are few. Having determined this point, proceed next to consider their—

Cultivation.—In order to cultivate orchids successfully, the first point of importance to bear in mind is, to reproduce artificially, as near as possible, the natural conditions under which they are found growing, and the preceding remarks indicate briefly what these are in a general sense. It must not be forgotten that, although they love moisture, heat and shade, free ventilation, absolute cleanliness and thorough drainage are more essential to successful cultivation than

anything else. These three points are emphasized here, as they are more often neglected than not, with very disheartening results. In the matter of shade, it is well to remember that it is not meant that the rays of the sun should be altogether excluded. What is necessary is, that there should be an equal division of sunlight and shade, such as is afforded by a tree, and which is reproduced admirably in a grass conservatory, if properly constructed.

Terrestrial orchids should, as a rule, be cultivated in pots, pans and hanging baskets, filled with a soil composed somewhat as follows :—Take charcoal varying in size from a pea to a walnut ; broken brick of the same size, or old mortar ; mix these with coarse leaf mould well decayed, and fill up a pot with the compost. See that large pieces of old mortar and charcoal are placed at the bottom, with a layer of moss or cocoanut fibre, for drainage. Into this plant the orchid.

Celestial orchids should always be grown attached to a log of wood, or square slabs of Teak-wood, to which they should be securely fastened by means of copper wire and tacks, taking care to spread the roots evenly over the log or slab, so as not to injure them. In the case of orchids having very fleshy roots, no covering of moss or Cocoanut fibre is necessary. It is only in the case of those having thin, stringy roots that this is at all necessary. The plants readily attach themselves to their supports, and go on thriving and forming new roots, so long as the atmosphere is kept moist, and they are not allowed to suffer from dryness.



Some of the modes of growing both kinds are given in figures 30, 31, 32 and 33. But these may be varied to suit individual tastes, especially in the shape and design of the hanging baskets. When pots are used, they should invariably have perforated sides,

by which thorough drainage is secured. The only objection to the latter is, that it admits of insects getting at the roots. To avoid this it is usual to place an inverted pot in water, and on top of this the pot containing the plant. By this means not only are insects kept out, but continued moisture is secured, especially at the hottest and driest time of the year, when orchids are in the condition of most vigorous growth. During the rainy season, however, the placing of them in water is not necessary; indeed, the problem the gardener has to solve at this time is, how best to keep his plants from getting too much moisture, and secure thorough drainage. In the case of such as are grown on logs, slabs, and in hanging baskets, this difficulty does not present itself. For potted plants the best plan is to keep them on the stands, either wooden or masonry, which are usually constructed in plant houses. Placing them on the floor should be rigidly avoided during the rains, especially in Lower Bengal, and in places where the rainfall is heavy and the atmosphere very much saturated with moisture.

Orchids, like most other plants, require a certain period in which to mature and ripen the wood; that is to say, a period of rest, when they cease to make any growth. During this time they require little or no water, or only sufficient to keep them alive. It is after they have had this rest, that they are ready to blossom to the best advantage. This period is almost the same here as in England, *viz.*, from November to February. It is usual, about the end of February, to do all the repotting, and general fixing up of the plants, for they begin to put forth their blooms about the first week in March. Some of them do so earlier, and in the latter case, a sharp watch must be kept on the plants for any signs of growth. As soon as the repotting and replenishing has been done, the plants should be watered, sparingly for the first few days, and as soon as they begin to show signs of vigorous growth, copiously. Syringing frequently during the day is a good plan. If a garden engine or hand pump is available, so much the better, as they are invaluable in the orchid and plant-house. If these directions are carefully attended to, and other surrounding conditions being favourable, a beautiful display of flowers of most gorgeous and varied hues may be expected, lasting for fully two months, March and April. Nothing can surpass in loveliness and variety a collection of Orchids in full bloom.

Propagation.—This is, perhaps, the most difficult operation in the cultivation of Orchids, and no hard and fast rules can be laid down which could be successfully applied to every species, differing as they do so widely in point of habit and growth. It may, however, be stated that, as a general rule, most orchids can be increased by division, either of the roots or the pseudo-bulbs. The following directions for propa-

gating orchids, given by Mr. B. S. Williams in his work, "The Orchid Grower's Manual," will be found very useful, being equally applicable here as elsewhere.

"I. Some are easily increased by dividing them into pieces, or by cutting the old pseudo-bulbs from the plants after the latter have done flowering. Such plants as Dendrobiums are increased in this way. The best time for this is just as they begin to grow, or when they are at rest. They should be cut through with a sharp knife between the pseudo-bulbs, being careful not to harm the roots. Each piece should have some roots attached to it. They should be parted and potted, and receive no water till they have begun to grow.

"II. **Dendrobium Nobile, D. Pierardii, &c.,** are propagated (*a*) by bending the old pseudo-bulb round the basket or pot in which they are growing; (*b*) by cutting old flowering bulbs away from the plant, laying them on damp moss, and when they make roots, potting.

"III. **Dendrobium aggregatum, D. densiflorum,** and similar, are increased by dividing the roots.

"IV. **Aerides, Vanda, Angrœcum, Saccolabium, Renanthera,** (*a*) by cutting off the top of the plant, just below the first root, and (*b*) by taking young growth from the bottom of the plant.

"V. **Epidendrum, Cymbidium, Cattleya, Cœlogyne, Bletia,** and many others, by dividing into pieces with portions of the roots attached, and a young bulb on the pseudo-bulb."

The foregoing directions are certainly limited, but they illustrate the general principles of propagating orchids. Much will depend upon the growth of individual species, and it is only by experience that the gardener will be able to arrive at the best, quickest, and safest method of increasing any particular variety. Thus, in the case of orchids of purely epiphytal growth, such, for example, as Phalœnopsis, which throw up separate growths, which are in themselves fully developed plants, it will only be necessary to sever these (and this is easily done) by cutting through with a sharp knife, taking care not to injure the roots, and attach them to logs and slabs to secure fresh plants. Opportunity has been taken to give general directions only here; but the methods of propagation applicable to each genus will generally be found under each particular head.

The best season for propagation is certainly just before the plants begin to grow, *i.e.*, in February. Many of the species are, however, best increased during the rainy season; and there are some gardeners who prefer this time of the year, as there is less chance of the plants dying off for want of moisture. The writer, however, has always been in favour of February.

The Orchid House.—It is always more satisfactory to grow orchids in a house exclusively devoted to them, as they can then be attended to with greater facility. A structure such as that described at page 36 of which an illustration is given at figures 9—12, will be found best adapted for these plants. The water in the centre is most essential during the hot, dry months of summer. During the rainy season it is essential to keep this tank dry. If it slopes in one direction, and has a suitable outlet, there will be no difficulty about this.

In those cases where it is found impossible to have a separate house, the common grass conservatory devoted to other plants will answer just as well, provided there is a reservoir of water in the centre. If a pressure of water can be obtained, one or two fountains, or a finely perforated zinc or lead pipe running along the upper part of the walls of the house, would prove an admirable arrangement for cooling and moistening the atmosphere of a plant house, by allowing water to run along these pipes and fall in a fine spray. This would, however, only be necessary during the months of April, May, and June.

Orchids may also be grown in glass houses on the plains; but these structures must be cool, well ventilated, and have a shade of some sort on the roof, to subdue the fierce heat and light of the sun. During the cold months a glazed house is found very useful; for the plants having finished their growth, may be then placed here, and be so protected from severe cold, such as they would be subjected to in the Upper Provinces, until their period of growth came round again.

Cultivation on the Hills.—For the information of those who devote some of their leisure to cultivating these beautiful plants on the hills, it may be stated that their treatment is almost in every particular the same as that adopted in England. And as there are so many hand-books extant on the subject, it is not considered necessary to give any detailed directions here. Suffice it to say that orchids on the hills must be grown in hot-houses. The methods of propagation given for the plains apply equally to the hills; while the directions as to soil, potting, rest, and the various methods of growing them, are also similar.

The plants enumerated and described below do not, of course, comprise all the species in cultivation. To do this would be a task much beyond that which was contemplated in a work such as this. Every day new species and varieties are being added, while collectors in all parts of the world are continually sending immense consignments of orchids, amongst which many new, rare, and hitherto unknown species are always found. It will therefore be obvious that any attempt at a comprehensive description would be quite impossible. But it may

be stated that the most important, well-known types, and those most commonly met with in Indian gardens, will be found fully described.

Dendrobium.

A genus said to contain nearly four hundred species, very many of which, and among the most beautiful of the whole order, are natives of the Assam Hills. They are found for the most part to thrive well in the locality of Calcutta. Several blossom with drooping festoons of flowers; these it is best to grow in suspended pots or baskets. With some it answers merely to attach them to the limb of a tree, binding them on with a little moss or Cocoanut fibre.

1. **aggregatum.**—Flowers large, deep-orange, in large compact clusters; a lovely plant, not at all uncommon in Calcutta, where it thrives well. Also **D. aggregatum majus.**—A larger flowered variety.

2. **D. Andersonii.**—Leaves smooth and bright green; blossoms in June, with beautiful pure white strongly aromatic flowers.

3. **D. angulatum.**—Native of the Andamans; bears pretty pure white flowers of a delicious honey-scent, which last only eight hours.

4. **D. calceolaria.**—A large straggling plant with rod-like striated stems, three to six feet long. Flowers bright yellow with two purplish brown spots on the lip.

5. **D. Cambridgeanum.**—Stems thick and nodose; flowers bright yellow with brown spots.

6. **D. Chrysanthum.**—Native of Assam; a remarkably handsome plant, with its rich thick glossy leaves, which set off admirably its fine large trusses of orange-coloured flowers.

7. **Dalhousianum.**—Stems stout, smooth, and plump, marked with purple lines. Flowers in racemes, four inches across; creamy-yellow tinged with rose; lip yellow at the base, marked with a pair of large crimson spots.

8. **D. densiflorum.**—Native of Sikkim. Pseudo-bulbs club-shaped; terminal leaves fleshy. Flowers in dense drooping panicles, yellow with orange lip.

9. **D. Devonianum.**—Native of Khâssya; a slender plant. Flowers of great delicacy and beauty, having a large frilled white lip, tipped with crimson, and with two kidney-formed orange spots in the centre.

10. **D. Falconeri.**—Native of Sikkim. Stems branched, very narrow; strongly knotted, four feet long. Flowers white tipped with purple, lip white with rich purple blotch at the base, and golden margin. One of the finest.

11. **D. Farmeri.**—In habit somewhat like densiflorum. Flowers looser, variable, pink and yellow. Also **D. Farmeri album**, with white flowers.

12. **D. fimbriatum.**—Native of Assam ; a splendid plant, producing large handsome trusses of bloom well relieved by the rich foliage. Flowers apricot-yellow, two inches across. Var. **oculatum** with a kidney-formed blood-coloured spot on the base of the lip.

13. **D. formosum.**—Flowers white with deep yellow stain on lip. Var. **gigantium** from Burmah.

14. **D. Jenkinsii.**—Native of Goâlpâra ; a pretty, compact little Orchid, with strap-like leaves, two or three inches long ; bears a pretty cluster of apricot-coloured flowers.

15. **D. macranthum** *syn.* **macrophyllum.**—Native of the Philippines. Flowers six inches in diameter, rosy-pink ; lip with deep claret stain ; scent unpleasant. The finest and largest of all.

16. **D. nobile.**—Native of N. India. A lovely plant when in full blossom. Flowers two inches across, white, deeply-tinged with violet, with two club-formed deep purple spots on the base of the lip. There are **Wallichii, Lindleyanum,** and other varieties differing in colour.

17. **D. Parishii.**– Semi-pendulous with thickish bulbs. Flowers numerous, beautiful rosy-purple.

18. **D. Pierardii.**—Flowers large, French-white, borne in drooping festoons of blossom several feet long. A most beautiful Orchid, very common about Calcutta, where it thrives well on the bough of a tree. There is a variety, **latifolium,** of double the size.

19. **D. secundum.**—Native of Borneo. Stems short and thick, with spikes of deep rose-coloured flowers.

Others met with about Calcutta are : **D. albo-sanguineum; D. amœnum ; D. chrysotoxum ; D. cœrulescens ; D. crepidatum ; D. cretaceum ; D. crystalium ; D. Gibsoni ; D. Griffithii ; D. heterocarpum ; D. infundibulum ; D. Macarthiæ ; D. multicaule ; D. nodosum ; D. onosmum ; D. Paxtoni ; D. primulinum ; D. speciosum ; D. tortile ; D. transparens ; D. Bensonœ ; D. bigibbum ; D. Crassinode ; D. Freemanii ; D. Hillii ; D. longicarne ; D. lutiflorum ; D. pulchellum ; D. suavissimum ; D. sulcatum ; D. superbiens ; D. undulatum ; D. taurimum ; D. thrysiflorum ;** and **D. Wardianum** ; one of the grandest of all the species.

Coelogyne.

A genus of Orchids entirely Eastern, and mostly natives of the hills of India. The following are met with in Calcutta :—1. **C. media ;** 2. **C. rigida ;** 3. **C. nitida ;** 4. **C. undulata ;** 5. **C. flaccida ;** 6. **C. ochracea ;** likewise the two accounted the most beautiful,

7. **C. christata,** bearing racemes of fragrant white flowers, four inches across, with beautiful yellow and orange stains on the lip; and 8. **C. odoratissima,** unsurpassed for its fragrance. Also **C. barbata,** and **C. massangeana.**

Epidendrum.

This genus, which is said to comprise above three hundred species, is confined almost exclusively to South America. Few, Mr. Warner states, are worth growing except for their fragrance. Those most distinguished for the beauty and size of their flowers are **E. nemorale**; **E. Skinneri**; and **E. prismaticurpum,** unknown as yet, I believe, in this country. The following have been introduced, of which the two last are not uncommon in Calcutta: **E. vitellinum**; **E. falcatum**; **E. polyanthum**; **E. macrophyllum**; **E. cochleatum**; **E. crassifolium,** a free bloomer, bearing upright dense spikes of purplish, rose-coloured flowers: and **E. ciliare,** which bears white spider-like blossoms, two of the petals with pretty eyelash-like fringe. Also **E. grammatophyllum speciosum.**

Broughtonia.

B. sanguinea.—Native of Jamaica. Pseudo-bulbs flat and round flowers blood red; thrives and blossoms well in Calcutta.

Lœlia.

A South American genus, containing some of the most superb of the Orchids. They are terrestrial. **L. anceps**; **L. majalio**; **L. purpurata**; **L. superbiens,** accounted amongst the finest, have been introduced of late into Calcutta, as well as **L. acuminata**; **L. autumnalis**; **L. albida**; and **L. Dayana.**

Cattleya.

A genus closely allied to the above, and confined principally to Central America and the Brazils. The flowers they bear are accounted to be amongst the largest in the order, some being as much as seven inches across from tip to tip of the petals. The finest of all is **C. Warscewiczii.** Next to it stand **C. Mossiæ**; **C. labiata**; **C. crispa**; **C. Skinneri**; **C. Aclandiæ**; which have been introduced into Calcutta, and flower well in the grass orchid-house and conser-

vatory. Also **C. amathystina**; **C. citrina**; **C. Eldorado**; **C. Gaskelliana**; **C. Gigas**; **C. Imperialis**; **C. intermedia**; **C. Leopoldii**; **C. Mendellii**; **C. Nobilior**; **C. Percivaliana**; **C. Sanderiana**: **C. Speciosissima**; **C. Trianæ**; and **C. Warneri**.

Brassavola.

A genus of Orchids of tropical America remarkable for the fragrance of their flowers, with long-tailed petals. **B. cucullata** and **B. glauca** are met with in Calcutta.

Phaius.

A genus of terrestrial Orchids, grown in pots in light, rich soil; natives of the East, of which 1. **P. maculatus,** with yellow flowers and 2. **P. Wallichii**, with dull-orange or tawny flowers, are well known in Calcutta. Also **P. Grandiflorus** and **P. Albus**.

Thunia, *olim* Phaius.

T. Bensonii, and **T. alba,** which, Mr. Jennings tells me, grow well in the open ground, in broken brick beneath a Mango-tree, and display their beautiful white flowers in July.

Arundina.

A. bambuscefolia.—A terrestrial Orchid, grown in pots, like Phaius; native of Nepal, nearly allied to Bletia, a slender, reed-like plant, not uncommon in Calcutta, where, in the month of September, it bears thin purple flowers.

Bletia.

1. **B. hyacinthina.**—A terrestrial Orchid; native of China; begins to start its corms about the middle of November, when it should be repotted; a good light leaf-mould soil, with plenty of crocks for immediate drainage, and broad, rather, shallow pots, are most suitable to it; displays its abundance of bright pink flowers in February and March.

2. **B. verecunda.**—A terrestrial Orchid; native of the West Indies; flowers very similar to those of the preceding, borne nearly always,

but principally at the end of September, when it throws up long flowering stems three feet high, displaying their flowers in full beauty for more than two months; ripens abundance of seed during the cold season; cultivated same as the last.

Spathoglottis.

A. Fortunei.—A terrestrial Orchid; native of Hong-Kong; flowers yellow, described as, in character, much resembling the preceding. Cultivation same as Bletia.

Cyrtopera.

C. flava.—Native of India; a terrestrial Orchid; flowers large, golden yellow, very beautiful upon their large spike; grows in the ground of the common border, where its spike of blossom springs up in May, before any of the leaves appear.

Vanda.

A genus of beautiful orchids, natives of Assam and the Khâssya Hills, mostly; many are natives of Bengal. They are all celestial, and on that account must be grown attached to blocks of wood and squares of teak.

1. **V. gigantea.**—A noble Orchid; flowers large, thick-petalled, expanded, and somewhat resembling buffish-yellow butterflies, upon their fine large, deep-green, handsome foliage.

2. **V. Roxburghii.**—Native of Bengal; often met with growing upon the boughs of Mango-trees; flowers above checkered with yellow and dusky ferruginous-purple, beneath white; not very attractive. There are several varieties; one entirely of cream colour.

3. **V. teres.**—Native of Assam and Khâssya; a curious plant, with pale-green stem-like cylindrical leaves, which vary from the thickness of a cedar-pencil to that of a quill; flowers large, erect, very handsome, of a pale-rose colour; the lip having the form of a monk's cowl, large enough to hold a walnut, deep pink with dark bars, tied on by two broad ribbons below the chin. Not an uncommon plant in Calcutta.

4. **V. cærulea.**—Flowers borne in splendid racemes about a foot long, ten or twelve in each raceme; having the general form of a star four inches across, with five wavy, pear-outlined rays, beautifully mottled by the reticulations, being of a deep violet blue upon a paler ground of the same colour; the base of the lip small, deep-purple,

projecting from the centre of the flower. The flowers fade in time to an almost pure white. In full blossom in November. Leaves strap-like, coriaceous, polished, and equitant. One of the loveliest and most valued of Orchids.

5. **V. Cathcarti.**—Native of Jyntcah; flowers very large, rose-coloured externally, petals yellow internally, densely striped with transverse lines of deep orange red. Dr. Lindley says:—"No more remarkable Orchid has been found in Northern India; and though not so showy as the gorgeous Dendrobia (Chrysanthum, Devonianum, Farmeri, &c.) amongst which it grows, it exceeds any of these in its singularity and in its chaste, elegant appearance.

6. **V. cristata.**—Native of Assam; a small plant, bears curious greenish-white flowers, remaining a very long time in blossom, and resembling somewhat a little bird striped with crimson, sitting in its nest.

7. **V. Batemanni.**—Native of the Philippines; a stout, erect-growing plant, with thick straight leathery leaves. Flowers in large erect spikes more than three feet long, creamy yellow mottled; the reverse rose colour, two and a half inches across; of leathery texture, lasting as long as two months, opening in June.

8. **V. Lowii.**—Native of Borneo; habit like that of Renanthera, but with larger leaves bending gracefully over. Flowers borne on long pendulous racemes, sometimes eight to ten feet long, being of two distinct kinds on the same spike; the lower ones of tawny yellow, the upper ones pale yellow mottled like tortoise-shell.

9. **V. cærulescens.**—Somewhat like **V. cærulea,** but smaller spike longer.

10. **V. Denisoniana.**—Close in habit to 11. **V. Roxburghii**. and 12. **V. Roxburghii var: cærulea**; 13. **V. Jenkinsii** and 14. **V. Bensoni.** Also 15. **V. Hookerii**; 16. **V. insignis**; 17. **V. lamellata Boxallii**; 18. **V. Parishii**; 19. **V. Suavis,** and 20. **V; tricolor.**

Renanthera.

1. **R. coccinea**—CHINESE AIR PLANT.—Native of China; flowers with narrow, bright coral-red petals, of spider-like form, borne during the hot season in immense profusion, and in long succession upon their antler-like flower-stems. This plant is said to be one of the principal favorites in the gardens of the Mandarins. It thrives vigorously in the region of Calcutta, and blossoms to perfection bound to a large upright log by moss fastened with copper wire, and exposed throughout the year to the full power of the sun, as shown in Figs. 30—32.

2. **R. arachnites.**—Called also **Arachnis moschifera**; bears sprays of about twelve flowers, much like huge spiders, five inches across, of a lemon-colour with great purple spots, emitting a delicate scent of musk; considered one of the most remarkable of all the Orchids. This, like the last (as Mr. John Scott tells me is the case with most of the China Orchids), requires full exposure to the sun. Also **R. Lowii** and **R. Storerii**.

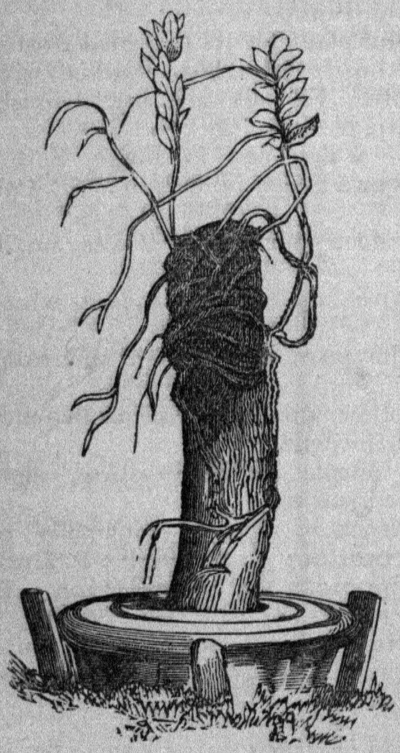


Fig. 31.

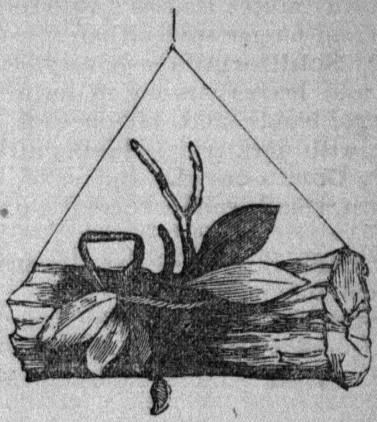


Fig. 32.

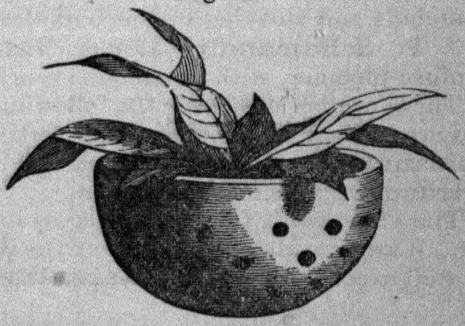


Fig. 33.

Phalænopsis.

1. **P. amabilis**—QUEEN OF THE ORCHIDS—INDIAN BUTTERFLY PLANT—Native of Amboyna; flowers very large, milk white, leathery;

lip marked with purple lines; resembling a butterfly with expanded wings, lasting unimpaired for several weeks. This most choice and magnificent plant is always grown fastened with moss and copper wire upon a log. It may be easily propagated by binding a piece of moss round one of the joints of the flowering-stalk, which will emit roots, and may then be removed and attached in the usual way to another log.

2. **P. grandiflora.**—Very similar to the last, but lip stained yellow. Mr. Warner states that as a rule the specimens from Java have larger flowers and longer spikes than those from Borneo.

3. **P. Schilleriana.**—A very beautiful plant for its flattened frosted roots, and leaves similar in form to those of the last, marked with transverse bands and blotches of white. Flowers fragrant, pinkish-mauve, with dark purple spots on the lip.

4. **P. Cornu-cervi.**—Spikes of flowers flattened in shape like a stag-horn, small, yellow barred with brown; not uncommon in Calcutta.

5. **P. Lowii.**—Flowers white with deep purple lip, leaves small, and deciduous in the cold season.

6. **Parishii.**—A very small plant, with small but abundant white and purple flowers.

7. **P. rosea.**—Blossoms nearly all the year round from the same spike.

8. **P. Manneii.**—Flowers creamy yellow, small and inconspicuous: abundant and thriving in the Botanical Gardens.

9. **P. Schumannii.**—Leaves rich purple on the reverse, most profuse bloomer, with enormous branched spikes.

There are besides these the following species, natives principally of the Straits and Phillippines:—**P. intermedia**; **P. Listerii**; **P. Luddemanniana**; **P. Sanderiana**; **P. speciosa**; **P. Sumatrina**; **P. tetraspes**; and **P. violoceum**.

The great point to obtain success in the cultivation of these plants, Mr. Warner states, is to render the leaves healthy, by keeping them as well exposed to the light as possible.

Saccolabium.

Flowers generally small, but borne very numerously in large dense clusters of a plume-like form, most exquisite in colour and delicate in character. Grown attached to a log in the same way as Vandas.

1. **S. giganteum.**—A magnificent plant from Burmah, with broad, lightest green leaves; bears in December and January an immense spike with large, very fragrant flowers, white spotted with violet.

2. **S. guttatum** (*syn.* **S. retusum**).—An old-established plant in Calcutta; bears spikes of bloom a foot or more long of small white flowers spotted with rose, described as assuming a tail-like, almost cylindrical form. Also **guttatum,** *vars:* **densiflorum, giganteum** and **Holfordii.** Others known in Calcutta are:—**S. micranthum**; **S. miniatum**; **S. ampallaceum**; *var:* **Moulmeinensis**; **S. Blumei**; **S. denticulatum**; **S. curvifolium**; **S. Harrisonianum,** and **S. violaceum.**

Aerides.

Flowers resemble in general appearance those of Saccolabium.

"There is probably no genus among Orchids," says Mr. Warner, "the species of which are more generally ornamental—no species not worth growing. Even when not in blooom, the different species, all similar in habit, are all good-looking objects, from the pleasing disposition of their substantial-looking foliage." The flowers are borne upon long spikes, like Saccolabiums, but are smaller in size. Cultivated in the same way.

1. **A. affine.**—Native of Assam; bears rose-coloured flowers.

2. **A. odoratum.**—Native of Assam; bears pretty trusses of bloom with small white flowers tinted and spotted with pink, having the form of a curved horn, and diffusing an exquisite lemon-like fragrance. Also the var. **O. majus.**

The first two have been long well known in Calcutta. Of later introduction, and all of great beauty, are:—3. **A. Lobbii**; 4, **A. Fieldingii**; 5. **A. quinquevulnerum**; 6. **A. virens**; and 7. **A. Lindleyanum,** the last in Mr. Grote's collection, and spoken of by him as perfection. 8. **A. roseum,** and 9. **A. suavissimum.** Also **A. crassifolium**; **A. crispum**; **A. expansum Leoniæ**; **A. maculosum,** and **A. rubrum.**

Angræcum.

A. superbum.—Flowers large, white, remarkable for the length of the spur; in one species as much as a foot and a half long. **A. sesquipedale** is the grandest of the species, with immense spurs. **A. eburneum** and **falcatum** are also worth cultivating. These are terrestrial Orchids, and should be grown in pots.

Cymbidium.

1. **C. aloifolium.**—Native of India; flowers dull-purple and russet; not attractive; a very common and hardy Orchid; grows well, left to itself, on the limb of a tree. To be met with also in Calcutta are

the Indian species; 2, **C. giganteum**, with racemes of very large brown tesselated flowers; 3, **C. Mastersii**, with white fragrant flowers and rush-like leaves; 4, **C. eburneum**, like the last, amongst the largest and sweetest of the genus, flowers large, radical, ivory-white, smelling like Lilac; 5, **C. elegans**, with massive pendulous spikes of yellowish flowers; 6, **C. lancifolium**, **C. Lowianum** and **Parishii** are recent introductions.

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Grammatophyllum.

G. Finlaysonium—now called **Bromheadia palustris**—native of Penang; an immensely stout-stemmed hardy Orchid, has been in the Calcutta Botanical Gardens a great many years, but has never flowered.

Oncidium.

A genus comprising more than two hundred species, confined entirely to tropical America. Many are natives of the mountains and require no very high temperature. The few comparatively known till recently in Calcutta are:—1, **O. ampliatum**; 2, **luridum**, these two are well established, and flower regularly; 3, **O. crispum**; 4, **O. bicallosum**; 5, **O lanceanum**, accounted the most beautiful of all; and 6, **O. papilio**, the famous Butterfly-plant.

The recent introductions of this beautiful species are: **O. ampliatum majus**; **O. aurosum**; **O. bifolium**; **O. Carthaginense**; **O. Cavendishianum**; **O. concolor**; **O. flexuosum**; **O. recurvum**; **O. Kramerii**; **O Limminghii**; **O Marshallianum**; **O. onithorhyneum**; **O. papilio majus**; **O. tigrinum** (*Barkeri*); **O. varicosum**, and **O. Wentworthianum**.

Stanhopea.

Plants remarkable for the way in which they thrust their spikes of flowers through the bottom of the baskets in which they are suspended. **S. martiana** and **S. tigrina** thrive well, and have flowered in the Botanical Gardens.

Calanthe.

1. **C. vestita**.—A terrestrial Orchid, native of Moulmein; throws up in the cold season a spike of large milk-white flowers, with deep rosy eye. There is a variety with a yellow eye (**vestita nevalis**).
2. **C. masuca**.—Native of Northern India, bears purplish flowers in a hyacinth-like spike. Also **C. veratufolia**.

Limatodes.

L. rosea.—A terrestrial Orchid, nearly allied to the last; very chaste and beautiful, when in the cold season it sends up its deep rose-coloured flowers with crimson spot in the centre.

Vanilla.

The different species of **Vanilla** are said to do best potted in moss, the pots well drained with potshreds, with a trellis for the plants to be trained upon. They are also very ornamental when nicely trained upon a long upright log of wood with the end securely fixed in a flower-pot for a stand, as seen in Figs. 30—32. They should be fastened on with a little moss or Cocoanut fibre. Cultivated in this way, I have seen beautiful flowering specimens at the Calcutta shows. They are easily propagated by cuttings of the stem taken off at a joint. The following are pretty common in Calcutta, and bear greenish-white flowers :—1, **V. alvida**; 2, **V. aromatica**; 3, **V. grandiflora**; 4, **V. ovalifolia**; 5, **V. planifolia**, which emits a delicious fragrance at night.

Anæctochilus.

A genus of terrestrial Orchids. Must be grown in fibrous mould and sand to succeed. Propagated by cuttings and division.

1. **A. setaceus.**—A terrestrial Orchid, native of Ceylon, it is called the King of the Woods, and grows commonly in the hedgerows.

"The flowers are not at all beautiful, but the leaves are the most beautiful of all the leaves in the world. The ground colour is dark velvety green, tinged with a metallic lustre, curiously inlaid, as it were, with streaks of golden network."*

One of our rarest and choicest plants, always grown in a pot under a bell glass; but the management of it with success has hardly yet been ascertained.

2. **A. Dawsonianus**—Native of the Indian Archipelago; leaf four inches long, rich olive-brown with reddish golden veins.

3. **A. Ordianus**—Native of Singapore. Rhizomes thick as a man's little finger; leaves bright metallic green, with delicate golden lines; similar in shape and habit to the last. Both are of more robust habit than any other species, and are deciduous in the cold season, when they require rest. Also **A. Lowii** and **A. Xanthophyllum**. Most of the above are common on the hills.

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* 'Cottage Gardener's Dictionary.'

Cypripedium.

VENUS'S-SLIPPER.

A genus of most interesting terrestrial Orchids, formerly found very difficult to preserve, and consequently great rarities in Calcutta; but now, since cultivated in grass conservatories, thriving well and blossoming beautifully in the cold season. The following are those commonly met with:—

1. **C. venustum**—Native of Nepâl and the Khâssya Hills; a small, very handsome plant, with the underside of its leaves prettily tesselated with purplish black; produces curious large white and russet-green flowers, spotted and striped with purple.

2. **C. insigne**—Native of Nepâl; leaves pale green, somewhat similar to the above; flowers large, pale tawny-green, with spotted lid. **C. Maulei** is a variety with larger flowers of richer colour.

3. **C. concolor**—Native of Moulmein; a very beautiful plant, with strap-shaped, smooth, polished-green leaves, mottled with whitish markings; bears large, handsome, primrose-coloured flowers.

4. **C. Hookeri.**—Somewhat like the last, only with markings more decided.

5. **C. niveum**—Native of Moulmein; snow-white. 6, **C. hirsutissimum**; 7, **C. purpuratum.**

The later introductions are: **C. Boxalli**; **C. calarum** (a hybrid); **C. ciliolare**; **C. Dominii** (also a hybrid); **C. grande** (a hybrid); **C. Lawrencianum**; **C. Lowii**; **C. Roezlii**; **C. Sedeni** (a hybrid); **C. selligerum**; and **C. Stonei.**

The best way to grow these plants is in pots filled with broken charcoal, large pieces of brick, and some well-decayed leaf-mould and sand. They do not bear sunshine well.

Odontoglossum.

A very extensive genus of American Orchids, natives chiefly of Mexico and Columbia. They are very beautiful, and comprise over 150 varieties. Their cultivation has not been attended with success in this country, as they are mostly what are known as, "Cool Orchids," and bloom in the winter months even in England. The following varieties may, however, be met with in some of the Calcutta gardens:— **O. Alexandræ**; **O. Citrostum**; **O. Londesboroughianum**, and **Vexillarium.**

Mormodes.

A small genus of Mexican Orchids of no great beauty. They do not succeed very well in this country, the family being represented by one

single species, **M. laxatum eburneum**, to be met with in one or two gardens about Calcutta.

LILIACEÆ.

Tulipa.

TULIP.

Gool Leila.

I have never heard of a single instance of the Tulip having been cultivated with success in this country on the plains. Both when residing at Ferozepore and at Howrah I procured bulbs from England, but on each occasion with the most unsatisfactory result. Some never started at all, and those which did, merely put forth a miserable leaf or two. They grow to perfection on the hills, where the bulbs should be put down in February, in the same way as the Narcissus.

Fritillaria.

Comprises the different kinds of Fritillarias, as well as the old familiar Crown Imperial; all quite unadapted to the climate of Bengal. When at Ferozepore I procured a selection from England. The Crown Imperials had pushed forth long roots by the time of their arrival; but the Fritillarias were still dormant. On being potted they remained in the same condition, never making any growth whatever, and in course of time perished. They grow to perfection on the hills, and should be treated in the same way as the Narcissus.

Lilium.

Both when at Ferozepore and at Howrah I made attempts to introduce several kinds of Lily commonly cultivated in England at that time, but on each occasion with most unsatisfactory results. The bulbs do not bear being kept long out of the ground, and are sure to arrive here in a more or less damaged condition. Some were entirely decayed on reaching me; others in a tolerably sound condition never started, and some, one or two only, did so to die off speedily on the approach of the hot season. Many new species from Japan have, however, appeared since then, the introduction of which has proved more satisfactory. The want of success hitherto may be owing to the exhausted condition of the bulbs, from which they never recover, rather than from any unfitness of the climate. For it is stated that at the Calcutta Flower-show of March 1868, Mr. G. Livesay exhibited two new kinds of Lilies, unnamed, flowering then for the first time, from bulbs received from the Mauritius three years previously. This

is just what happens with the **L. auratum**, brought now to England in such quantities from Japan : many never recover from the effects of the journey, and those that do, take two or three years before they flower. This magnificent species, too, has flowered in Calcutta ; but not, as I learn, very satisfactorily. In Upper India and on the hills, the case is quite different ; and they thrive to perfection if planted in time—on the plains in October, and on the hills in February and March. A light rich soil suits them.

1. **L. longifolium.**—A common plant in the gardens about Calcutta. The bulbs are small, but throw up stems about fifteen inches high, bearing in March heads of noble fragrant white flowers, full six inches long. Several pots of this plant in full bloom afford for the time a most superb decoration for the verandah. The leaves die down about the middle of June, when the pots should be put away in some dry place till October, when the bulbs begin to start again. On the hills pot in March, and when the leaves die down in October, stow away the pots in some dry place. At that time they should be separated and re-potted : the larger ones singly for flowering, and the small ones three or four in a pot, to grow and mature themselves for flowering the succeeding year. When they have started into vigorous growth they require a liberal supply of water, and are the better for the pots being placed every alternate two days in pans of water, as well as for receiving occasional waterings of liquid manure. A rather rich soil, in which sand is mixed, suits them.

2. **L. Wallichianum.**—Native of Almorah and Nepâl. Described by Dr. Wallich as "a very distinct and noble species, with a tall and slender stem, two-thirds of which is thickly furnished with long and linear leaves. The flowers are white, fragrant, extremely large, with a very long and narrow tube which gradually widens into an ample spreading limb ; generally two or three on the apex of the stem."

Found in the Calcuttta Botanical Gardens, but a rare plant, I believe, in Calcutta.

The several varieties described in the catalogues of English nurserymen, may all be successfully grown in Upper India and on the hills. The treatment recommended for L. longifolium will suit them all.

Gloriosa.

G. superba.—A slender climbing plant, with small narrow leaves, and tuberous roots, said to be a most virulent poison ; native of India, and often to be met with growing wild ; bears during the rains curiously formed flowers of long, narrow, inverted, twisted petals, one half deep crimson and one-half primrose colour on first opening, but

afterwards becoming altogether crimson. The flowers, borne in profusion and mingled together in both these conditions, have a most beautiful effect. It dies down in the cold season, and lies dormant till the rains. The plant in full vigour is often infested by a caterpillar, by which, if not looked to, in a very short time it is entirely consumed.

Hemerocallis.

H. fulva—DAY-LILY.—A common plant in most gardens in India; bears heads of large tawny-yellow flowers of no great beauty. A variety with double flowers is met with in some gardens, but not common. **H. variegata** bears variegated flowers. Put down the bulbs in March, both on the hills and on the plains.

Funkia.

F. subcordata.—Native of China; a very handsome small pot-plant, not uncommon in Calcutta. Leaves cordate, of a dark pleasant green; bears in August umbels of large, white, sweetly-fragrant, drooping, bell-formed flowers, four inches long, opening of an evening. Propagated by division of the roots in March. They begin their growth in this month on the hills, when they should be repotted in fresh soil. The roots are of a fibrous nature, and will not bear being much disturbed, or the plants will fail of blossoming. **F. variegata,** bears variegated flowers.

Agapanthus.

A. umbellatus—BLUE AFRICAN LILY.—A most noble plant, occasionally, but not often, met with, and not thriving well in Calcutta gardens; bears upon a long scape, during the rains, a large umbel of large, handsome, azure-blue flowers. Requires the shelter of a verandah, and to be grown in a pot. A light rich soil suits it. Plant the bulbs in March on the hills, and keep in a green-house.

Polianthes.

P. tuberosa—TUBE-ROSE—*Gool-shubbo.*—The commonest, perhaps, of any plant in the gardens of India, and certainly one of the most delightful. Sends up stems usually three feet high; in a soil that suited it, I have seen them as high as six feet, bearing hyacinth-like clusters of pure white flowers, which diffuse an exquisite fragrance for a wide distance around, and under some states of the atmosphere, it is said, have been seen to emit electric sparks. After flowering the stems should be cut down, and others will spring up in constant succession throughout the year. Propagated by separation of the bulbs, as it

may be also from seed, which it produces in abundance during the cold weather. The double flowering variety bears lovely clusters of flowers, but not nearly so fragrant as the single. The stems of this variety require to be supported by stakes, or they are all but sure to fall with their own weight, and then look very unsightly.

Sanseviera.

An extensive genus of plants, many having a general resemblance to Aloes; some of them yielding valuable fibres; but hardly ornamental enough to be worthy a place in the garden. They need no particular care in cultivation.

1. **S. Capensis.**—Lately introduced, and is, perhaps, the prettiest of any for its thick, wavy, irregular-formed, dark-green leaves, with zig-zag lines across them.

2. **S. (Guineensis ?).**—A curious plant, with the leaves resembling a bundle of long, dark-green, ribbed horns, rising out of the ground; bears in the cold season, just upon the surface of the earth, a bunch of dirty-white fragrant flowers. A single leaf stuck in a pot of sand and watered will soon take root and form a new plant. Requires plentiful watering.

Aloe.

Dr. Voigt states that there were as many as a hundred species of Aloe formerly in Dr. Carey's garden at Serampore; but that most had died, and that he could enumerate no more than forty-two. About a dozen or fourteen species is the largest number I believe now to be met with in the Calcutta Botanical Gardens.

Some two or three have very ornamental leaves, and look handsome in pots; these, if left out in the rains, are very apt to perish from water lodging between the leaves, and causing them to rot at the point of junction. Many are easily propagated by inserting a leaf in a pot of damp sand. A light porous soil, through which the water given them is soon passed off, is manifestly that best suited to them.

1. **A. Abyssinica.**—A very large species, growing in the open ground in the Calcutta Botanical Gardens, and very showy when in full blossom in January and February, with its large flower-stem bearing innumerable small bright vermilion flowers.

2. **A. Indica.**—A common plant throughout the country; leaves thorn-edged, thick, soft, pale-green, crossed with lines of spots; bears dull red flowers. From the peculiarity of its foliage a pleasing variety among other potted plants.

3. **A. intermedia.**—A small handsome plant, with neat, clean-cut, strap-like leaves, speckled with green and white.

4. **A. nigricans.**—Exceedingly ornamental for its polished, black-green, well-cut leaves, of strap-like form; bears in March flowers varying from pale-green to lurid red.

5. **A. attenuata.**—A small plant with very succulent and curiously crimped leaves; bears in April small, greenish, insignificant flowers.

6. **A. saponaria.**—A small plant with curious, thick, short succulent leaves, crossed with dotted white lines.

Yucca.

ADAM'S-NEEDLE.

The species of Yucca known in Europe amount to as many as thirty. The following only, I believe, are those to be met with in this country.

1. **Y. aloifolia.**—A large plant, common everywhere in India, and familiar for its formidable array of long, hard, flattened leaves, each tipped with a needle-like thorn; bears in the rains countless white flowers, hanging most beautifully, like little bells, from its erect-growing flower-stem. The plant becomes disposed to blossom sooner by having the lower leaves cut away. The leaves, buried in damp earth till their soft parts decay, yield a strong tenacious fibre, very useful for tying up plants with. Propagated by offsets. There is a variegated variety of this plant, having the edges of the leaves of dull white colour, not particularly ornamental.

2. **Y. gloriosa**—SPANISH BAYONET—Distinguished from the last by its leaves being much narrower and spike-like; grows to very large dimensions before flowering, and is quite unsuited for any but gardens of great extent. Bears flowers similar to the last named.

3. **Y. stricta.**—A small plant in the Calcutta Botanical Gardens, never flowering there, and making little or no growth.

Allium.

Comprises several species, bearing umbels of different-coloured flowers with a strong smell of garlic; most have been introduced, but do not seem disposed to flower here.

A. fragrans.—A small bulbous plant; bears in April small umbels of greenish-white flowers, like those of the common Onion; interesting for their heliotrope-like fragrance.

Scilla.

A genus of small bulbous plants, producing flowers somewhat similar to the Hyacinth; not found to succeed in Bengal, but grow wel in Upper India and the hills. Treatment same as for Narcissus.

Ornithogalum.

STAR OF BETHLEHEM.

Of which there are several species; not cultivated with success here.

O. caudatum.—An uninteresting plant in the Calcutta Botanical Gardens; bears greenish-white flowers.

Muscari.

M. botryoides — GRAPE HYACINTH.—A pretty, diminutive bulbous plant, distributed abundantly in the North-West Provinces from the Saharunpore Gardens; thrives well in the border, and produces pretty racémes of dark-blue flowers, of about the size of black currants. I have never met with it in Bengal. Plant the bulbs in March.

Hyacinthus.

H. orientalis—HYACINTH.—By repeated trials it has been well ascertained that the Hyacinth cannot be brought to thrive and blossom, with any degree of satisfaction, in Calcutta or its vicinity. Of the bulbs that are imported some only produce a few leaves, while others, which appear forming for blossom, seem scarcely able to push themselves above ground, and instead of opening all the flowers in the cluster at once, open two or three first, which decay before the remainder expand.

In Upper India, however, their cultivation is attended with complete success. A selection of bulbs procured from England, with very little attention given to them, blossomed as beautifully as they are ever seen to do in Europe.

The best bulbs are always of a conical form. All flat-crowned ones are apt to give off numerous offsets, and rarely, if ever, give good flowers. Also

"Small bulbs are of the finest varieties. The size of the bulb has nothing to do with the fineness of the bloom, which is most commonly inversely as the size of the bulb."*

The pot in which a Hyacinth is grown should be eleven or twelve inches deep, the soil a mixture of well-decayed cow-manure and leaf-mould, and a very large proportion of sand, and a few wood ashes or small bits of charcoal. Some recommend the bulb to be planted three inches deep, but this would be to bury one of the principal features of beauty in the plant. The best plan perhaps is to plant

* Vilmorin's Catalogue, quoted in 'Gard. Chron.,' Sept. 1861.

the bulb with about a third above the surface of the earth, that the beautiful metallic colour upon it may not be concealed, and then attend to the following directions given by Sir J. Paxton :—

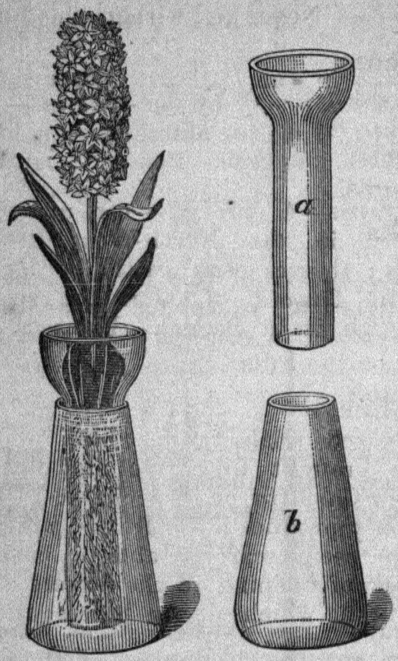

Fig. 34.

"The plant is unable to develop itself with a rapidity proportionate to the moisture it imbibes, when its upper surface is acted upon too immediately by the atmosphere. Hence the propriety of covering the bulbs with some light material. They ought invariably to be started by covering the pots containing them with three or four inches of old bark or half pulverized leaf-soil. A due share of moisture is thus preserved around both leaves, bulbs, and roots; and moisture is their vital element in the growing stage. When they reach the surface of the covering, they may be gradually introduced to the full existing measure of solar light, which will speedily restore the colour of the blanched foliage. Another important point necessary to their complete perfection is a large portion of river or white sand in the soil. Nothing is more prejudicial to them than stagnant water."

They can also be grown in the beautiful Hyacinth glasses to be met with now, filled with water, as illustrated in Fig. 34. The glass should be filled with clean, soft water, with a few pieces of charcoal and a little sand. Cover the bulbs with paper tubes until they start into growth; then expose them to light. *a* fits into *b*, thus allowing the water to be changed without disturbing the roots. On the hills they come to great perfection, where plant the bulbs in February.

Lachenalia.

Small bulbous plants, natives of the Cape of Good Hope; for the most part not succeeding in Bengal, though they do well enough in Upper India. Plant in October on the plains, and in March on the hills. An unnamed species, with spotted leaves and orange-yellow tubular flowers, is occasionally presented at the flower shows of the Agri-Horticultural Society.

Drimea.

D. revoluta.—A small pot-plant, with curious lurid-green leaves, covered with round white spots; bears in May spikes of small dull-pink flowers. Plant in February on the plains. Never met with on the hills.

Anthericum.

An extensive genus, represented in this country by one species—

A. vespertinum.—A small plant; bears in March, upon long bare stems, small white flowers of little interest. Plant in October on the plains. Not met with on the hills.

Dianella.

D. nemorosa.—A little bushy plant, native of this country, bears small white insignificant flowers; uninteresting except for its brilliant ultramarine-coloured berries of the size of a pea. Propagated by seed during the rains. Not met with on the hills.

Eustrephus.

Eu. angustifolius.—Native of New Holland; bears pale purple flowers, but ornamental principally as a small climbing plant of graceful slender character, and pretty drooping grass-like leaves. Propagated by cuttings during the rains.

Asparagus.

1. **A. acerosus.**—Native of Bengal; an erect herbaceous thorny plant, with needle-like leaves; bears, in the beginning of the cold weather, pure white, delightfully fragrant flowers. Dr. Roxburgh remarks, "a charming shrub." Propagated by division in the rains. Not met with on the hills; but may be grown under glass.

2. **A. racemosus.**—A very thorny, shrubby climbing plant, very beautiful for its foliage alone, which from a distance has somewhat the appearance of a Juniper; produces in November an unbounded profusion of minute white flowers, which perfume the air to a considerable distance around.

3. **A. ascendens.**—An erect-growing plant; blossoms in November, when it is most exquisitely beautiful, with its graceful sprays of minute flowers resembling delicate plumes of silver.

4. **A. plumosus.**—A lovely evergreen climber from South Africa, with smooth stems, and beautiful minutely divided leaves, having the appearance of plumes. One of the most ornamental-leaved plants yet introduced; bears small, white, insignificant flowers. A light rich soil suits it, with plenty of drainage. Propagated by division during the rains.

5. **A. plumosus nanus.**—An exceedingly graceful variety of the last named, but differing from it in being of dwarf, shrubby habit, and therefore admirably adapted for dinner-table decoration. Very similar to the last in general appearance, and particularly suited for furnishing cut sprays for intermixing with flowers. Treatment same as for the last named. Both the above are recent introductions, and are successfully grown in glazed structures on the hills.

Dracæna.

This is a genus of plants which included, under the old arrangement, a large number of species; but it has been split up into five different genera by Dr. Planchon. As, however, the plants, cultivated for the ornamental character of their leaves, which are remarkable for their beauty, are still popularly known under this old name, it has been considered advisable to retain it here. The plants are easy of culture, and thrive best in a rich, limey soil. They are very easily propagated by division; but cuttings put down in sand during the rains strike most readily. For pot-culture, or for beds, borders and rockeries; or for growing in clumps, they are admirably adapted. For dinner-table decoration they are unrivalled.

There are over a hundred varieties in cultivation; the most ornamental of them being of recent introduction. A great many of them are found in Indian gardens. The following list will be found to contain the best types, and includes as many as any ordinary collection need have. The first in point of beauty is:

D. Goldieana, from tropical Africa; quite distinct from any other Dracæna, having an erect slender stem, with the base of the leaves closely clasping it, spreading, being cordate-ovate-acuminate in shape, with a yellowish green costa, banded with dark green and silver grey in alternate straight or furcate transverse bands. The back of the unfolded leaves is of a reddish purple colour. **D. Lindeni** comes next, from Brazil, with elegantly recurved leaves of a deep green, traversed along their entire length with bands of creamy white and shades of yellow and rose. A plant of majestic growth, attaining a height of six to eight feet. **D. fragrans variegata,** somewhat similar to the last in habit, only the variegation is more central, while it produces delightfully fragrant flowers. **D. Bromfieldii,** from North Australia, is a beautiful plant of dwarf growth, with lanceolate leaves 1½ inches wide, drooping to a point; of a light green, striped and margined with ivory white. **D. Bausei,** one of the highly coloured varieties, of striking habit and free growth The leaves are four inches wide, of a dark bronze, margined with crimson. One of the best of this type. **D. Duffii,** from Australia, of dwarf

growth, with erect leaves a foot long and three inches wide, of a light bronzy colour. **D. Mrs. Hoskins,** a hybrid variety, very distinct, of dwarf habit, with leaves 12 inches long and 4 wide, of a light bronzy purple. **D. Mrs. C. J. Freake,** also a hybrid, very distinct and of moderate growth, leaves recurved, dark bottle-green, striped and edged along their entire length with creamy white and rosy purple. **D. Thompsonii**; a beautiful variety of dense growth, the leaves are deep green, bordered with rose, and having a patch of magenta in the centre. It is of handsome appearance, with broad, oblong leaves. One of the best in cultivation. **D. voluta,** a hybrid of pyramidal habit. The leaves are of stout texture, broad, and volutely recurved, of dark bottle-green, with edge and mid-rib of purple. A beautiful variety.

The ten varieties described above are perhaps the best in cultivation; although on this point tastes may differ. For those who desire to cultivate a larger number of varieties, the following list is given, from which a selection may be made :—

D. Baptistii; Barronii; Chelsoni; Cooperi; Ernestii; excelsa; formosa; fragrans; Gayii; Gladstonii; gracilis; Guilfoylei; Hendersonii; Imperialis; Knausii; lutescens; magnifica; Majestica; Massangiana; Mauritiana; metallica; Mooreanus; Mrs. Bause; Mrs. Turner; nigro-rubra; nigro-striata; Reali; Rebecca; reflexa; Reginæ; Seaforthii; Stella; superba; triumphans; Taylorii; umbruclefolia; virginalis, and Youngii.

Cordyline (*syn.* Dracæna).

1. **C. ferrea.**—A moderate-sized shrub, with long, lanceolate, dark-green leaves, with crimson edges, cultivated in most gardens for the highly ornamental character of its foliage; bears large compact bunches of very numerous, small, rose-coloured, very pretty flowers. Propagated by division, and cuttings in sand during the rains.

2. **C. terminalis**—SANDWICH ISLAND TEA-PLANT.—A shrub of the same size as the last; ornamental for its foliage, which is principally terminal upon the stems of a rich, light, most refreshingly verdant green; bears in March feather-like sprays of numerous small, pure white flowers. Propagated as above.

3. **C. reflexa.**—A shrub of somewhat smaller size than the last, and with smaller leaves, of the same form and of a most agreeable green; bears in the hot season yellowish-green, sweet-scented flowers. Propagated same as the last two.

4. **C. ensifolia.**—A very handsome and common shrub in gardens about Calcutta; five or six feet high; bearing on the summits of its stem crowded whorls of noble strap-formed leaves, of a rich refreshing

green, two feet long and four or five inches broad; from the centre of which spring out, in February, sprays of dense spikes of small white flowers.

Tupistra.

T. maculata.—Dr. Roxburgh describes this as a "shrubby caulescent species, native of Sumatra, three or four feet high." I have seen only small plants of it in pots in the Calcutta Botanical Gardens thriving very indifferently. Leaves broadly lanceolate, prettily marked all over with round white spots.

Ophiopogon.

O. Japonicum.—A small herbaceous plant with grass-like leaves, well suited for an edging to the border in the way Thrift is sometimes used in England; bears very numerous small flowers of a delicate lavender colour, upon footstalks of the same colour.

COMMELYNACEÆ.

Tradescantia.

SPIDERWORTS.

A genus of ornamental-leaved plants of low growth, thriving like weeds in this country and well adapted for rockwork and covering unsightly surfaces. Easily propagated by cuttings during the rains. There is very little difference between the Tradescantia and the two other representatives of the order noted below.

T. discolor.—A common plant about two feet high, with sharp-pointed leaves, of a deep verdant green, bordered with rich crimson; bears insignificant white flowers nearly all the year round.

Cyanotis.

C. Vittata.—(*syn.* **Tradescantia zebrina**).—A plant of prostrate growth, very ornamental, having deep, rich purple stems, with leaves of the same colour, striped with greenish grey, three inches long. Bears insignificant violet coloured flowers. Propagates itself by the prostrate stems throwing out roots wherever they touch the soil. Liable to become a troublesome weed if not kept within bounds. Admirably suited for rockeries and hanging baskets.

C. multicolor and **Zebrina argentea**, are very similar to the above in growth, with handsome leaves of many colours in the first, and striped with silvery white in the second.

Dichorisandra.

Ornamental-leaved plants of herbaceous growth, very similar to the foregoing in general appearance. **D. ovata** is a native of Brazil, with

ovate lanceolate leaves of a purple shot-green, and having stems of pea green marked with olive bars. Bears large heads of deep blue flowers. **D. musaica**; **longifolia vittata** and **undulata** are recent introductions here, and are remarkable for their large shining ornamental leaves.

ORONTIACEÆ.

Pothos.

A genus of ornamental-leaved, tropical plants of parasitic growth; very easy of culture in our grass conservatories. A soil similar to that recommended for Ferns suits them best. Planted in pots, and allowed to climb up a pole or trellis, they look remarkably handsome. They propagate themselves, as wherever the stem touches the soil, roots are thrown out from the joints. Cuttings also strike readily in any soil. The following are among the handsomest of the cultivated varieties:—

P. scandens.—A climber, having handsome, lanceolate leaves, two to three inches long, supported on broad-winged foot-stalks; Native of Amboyna. **P. Argyrea.**—A plant of more dwarf growth, with beautiful silvery leaves. **P. flexuosus.**—Native of India, with flattened rooting stems, the leaves being alternately directed to the right and to the left, from four to six inches long, of a beautiful shining pale green. Of epiphytal growth, and well adapted for covering walls. **P. Aureus.**—An extensive climber, having heart-shaped acuminate leaves of a dark green blotched with gold. A rather handsome plant. **P. macrophylla,** is a large climber, with leaves much larger than any of the preceding. **P. celatocaulis** is a recent introduction, and is, perhaps, the handsomest of the species. **P.** (*syn.* **Scindopsus**) **gigantea.**—A huge, climbing epiphyte, with immense leaves of dark polished green. Best grown on a large tree, upon which it hangs like a splendid curtain, when it has a truly magnificent appearance.

Anthurium.

Plants of more or less epiphytal growth, and forming one of the handsomest and most striking features of our plant houses, with their immense ornamental leaves. They are easy of culture; the soil recommended for Ferns suits them best. They love plenty of moisture with thorough drainage. Shade is essential to bring them to perfection. They are at their best during the rains. Propagated by cuttings during the rains in pure sand under a bell glass, or any substitute for one. Can also be raised from seed, which many of them bear abundantly. During recent years many beautiful species have been introduced; while the total number now in cultivation exceeds forty different varieties.

The following are among the most beautiful:—**A. Andreanum.**—Native of the United States of Columbia; a beautiful object, with its heart-shaped flower-spathe of a brilliant shining scarlet, and having an irregularly corrugated surface, like the cartilage of the ear. The spadix is white and yellow, and the plant remains in bloom for nearly three months. **A. crystallinum.** A noble looking plant, remarkable only for the beauty of its leaves, which attain a large size under favourable conditions. They are heart-shaped, of a deep, rich velvety green, the venation being picked out with bands of crystal white. **A. crystallinum**; *var.* **Williamsii.** An improved variety of the last named, with larger leaves and better marked. **A. Chelseiense.** A hybrid variety, obtained by crossing **A. Andreanum** and **A. Veitchii.** The leaves resemble the last named. The spathe is heart-shaped, 5 by 3½ inches, of an intense, shining, rich crimson, having white spadix tipped with yellow. A beautiful species. **A. Ferrierense.** A cross between **Andreanum** and **Ornatum.** Flower spathe of a bright rose colour. **A. grande.** As the name implies, a grand species, with immense leaves, broadly heart-shaped, of a light green, having a shiny velvety appearance. **A. Harrisii pulchrum.** Native of Brazil, with beautiful variegated leaves, heart-shaped, and rounded at the base. Pale green, flecked with silvery variegation. **A. insignis.** From the United States of Columbia. A striking species, with tri-lobed leaves of a lively green, and having a bronzy hue when young. **A. Macrolobum.** A hybrid variety, with short erect stems, and leaves of dark green with pale ribs. A handsome leaved variety. **A. magnificum.** One of the grandest of the species, an old favourite. **A. scherzerianum maximum.** A splendid variety with lanceolate cordate leaves, producing immense flower spathes over nine inches long and four broad, of a brilliant scarlet colour, with a twisted spadix. **A. splendidum.** A distinct and striking variety from tropical South America. The leaves are cordate, with irregular surface. The course of the nerves marked by a broad band of deep velvety green, the intervening spaces being of a pale yellowish green. The surface is scabrous, the portions between the ribs having a bulgy and quilted appearance. A plant of fine habit, and highly ornamental. **A. triumphans.** From Brazil; an erect growing variety, with heart-shaped leaves of a bright green colour, and ribs of paler green. **A. Veitchii** From Columbia, a striking plant with immense ovate-oblong leaves, two to three feet long and 18 inches broad. Coriaceus in texture, and of a deep green with a glossy metallic surface when fresh expanded. The nerves are arched and deeply sunk, giving the leaves a wavy appearance. **A. Warocqueanum.** This is regarded as by far the grandest of the ornamental leaved varieties. The leaves attain a length of over two feet, and

eight inches wide; are of a very deep velvety green, the mid-rib and nerves being picked out with white.

The above will suffice for any ordinary collection, but the following list contains most of the other varieties in cultivation in this country. They are all more or less ornamental: **A. Acaule**; **Barteri**; **Dechardi**; **Deckii**; **floribundum**; **Gibsoni**; **giganteum**; **glaucescens**; **Hookerii**; **hybridum**; **Kalbreyeri**; **leuconearum**; **margaritaceum**; **miquielianum**; **nymphæifolium**; **ornatum**; **pedato radiatum**; **reflexum**; **regale**; **Roezlei**; **Species de Petropolis**; **subsequatum**; **trilobum**, and **Walniewi**.

PINACEÆ.

CONIFERS.

Pinus.

P. longifolia.—A lofty tree, native of the hills, but succeeds very well on the plains, where specimens of large size may occasionally be seen. It is, however, not well suited to gardens of limited extent, taking up far too much room. In large public gardens, planted on lawns, they have a fine effect.

There are other species of Pinus found on the hills, but they are unsuited for the plains. Propagated from seed.

Araucaria.

A genus of exceedingly handsome trees; superbly ornamental when grown upon a lawn, where there is ample space for them. Specimens of the undermentioned have at different times been brought in Wardian cases to Calcutta, where they thrive well. These possibly, in the course of time, may yield seed, and thus afford the means of raising young plants, otherwise it seems questionable whether plants will ever be obtained in this country except by importation. For the seeds travel very badly, soon losing their vitality; and propagation by cuttings, though attended with complete success elsewhere, has, as far as I can learn, been universally found to fail here. The leading nurserymen in Calcutta import large numbers of young plants from Australia, and thus keep up the supply. They have also been raised from seed, but barely five per cent. germinate; so that it is more convenient and profitable to import young plants. I subjoin, nevertheless, the method of striking cuttings as described by M. Courtins:—

"Some species strike much more readily than others. A. Cunninghamii most easily of any. Take cuttings of shoots half ripe, about

three inches long. Terminal shoots of side branches may be used. Let them lie till somewhat dry, to allow the turpentine to exude. When they have grown a few inches, bend the plants gently down towards the surface of the soil, and secure them in this position by small pegs. This will induce them to break out at the base. When the shoots which have thus pushed out have grown to a few inches, and become somewhat strong, it will be necessary to cut off the branch which was bent down, which may be used again as a cutting. This mode of treatment is applicable to all Conifers."

A soil composed of equal parts of garden loam, leaf mould and sand, intermixed with a good proportion of charcoal pounded, suits them best.

1. **A. excelsa.**—NORFOLK ISLAND PINE.—In its native locality a lofty tree, possibly unrivalled in beauty by any in the whole vegetable kingdom; many thriving trees of good height may be seen in the Calcutta Botanical and Agri-Horticultural Society's Gardens.

2. **A. Cookii.**—Native of New Caledonia. Grows very well out here. Very similar in growth and general appearance to the last, to which some consider it even superior in beauty, resembling gigantic candelabra. The full-grown tree, as seen in its native home, has been likened to a "well proportioned factory chimney of great height."

3. **A. Bidwelli.**—Native of Moreton Bay; in general character very distinct indeed from the two preceding; with prickly, sparkling, dark-green foliage. Some very handsome specimens are to be seen in the Gardens of the Agri-Horticultural Society and the Calcutta Botanical Gardens.

4. **A. imbricata.**—THE MONKEY'S PUZZLE.—Native of Chili; very similar to the last in growth and character of foliage; seems incapable of existing in the climate of this country, as all specimens hitherto introduced have soon died off.

5. **A. Cunninghamii.**—Native of Moreton Bay; with foliage of a softer and more cypress-like character than any of the preceding; grows most vigorously here. It has several times borne seed, sound in every respect, except in not having been impregnated by a male plant, consequently when sown, failing to germinate.

"This species," M. Courtins says, "may be propagated from the roots, and affords then nice young healthy plants. Cut the roots, those that are about the thickness of a quill, into pieces four or five inches long. Put them in sandy-peat, keeping the cut level with the surface of the soil."

6. **A. Mullerii.**—This is a recent introduction, also from Australia, and is in point of beauty considered superior to any of the foregoing. The pinnules are gracefully pendant, and of a rich reddish brown colour. Its greatest merit lies in being perfectly hardy in this country.

A. Rulei.—This is also a recent introduction from New Caledonia, and is of noble habit. The leaves are produced in whorls, and are pendulous, of a rich dark green. It thrives to perfection in this country.

It is perhaps needless to add that on the hills Araucarias must be grown in the greenhouse to bring them to perfection; for being subtropical plants, they are not "hardy" in the way of Cedars and Pines.

Juniperus.

JUNIPER.

Small low shrubs, for the most part not more than three or four feet high, of squat, irregular, and not very agreeable form, though the small-leaved foliage with its silvery hue is very handsome, and affords a pleasing variety in the garden. They are very slow growers. Propagated by cuttings during the rains; but more commonly by layers. Those cultivated in the Gardens of the Agri-Horticultural Society for distribution are:—1. **J. cernua**; 2. **J. Chinensis**; 3. **J. communis**; 4. **dimorpha**; and 5. **aurea**. Any common soil suits them.

Thuja.

ARBOR-VITÆ.

Moderate-sized shrubs, from four to eight feet high. Their well-known, exquisitely beautiful foliage renders them delightful ornaments in the garden. Several unnamed species are found in the Gardens of the Agri-Horticultural Society, introduced from China by Mr. Fortune. They may be easily raised from seed or propagated by cuttings; but it is observed:—

"Conifer cuttings cannot be taken indiscriminately from any part of the tree to be propagated. Cuttings from the side-shoots of T. Donniana, for instance, make plants that spread themselves out flat, as if they were crucified. Their shape resembles that of the lower branch of a Spruce or Silver Fir broken off, and stuck upright in the ground."*

T. Orentalis.—A common and very beautiful species, met with in gardens of most parts of India. **T. O. aurea** (*syn.* **Bista**), is a dwarf variety, having a superb golden appearance when it puts forth its fresh foliage, has been lately introduced.

There are one or two other species; but are so similar in appearance to T. Orientalis, as to be almost indistinguishable from it.

* 'Household Words,' vol. xiii. p. 579.

Cryptomeria.

C. Japonica—JAPAN CEDAR.—When of full growth, a tree of immense stature, native of the north of China. Plants of this handsome tree were introduced some years ago into the Gardens of the Agri-Horticultural Society, and are now more commonly met with in this country. Treatment same as for Cypress.

Cupressus.

CYPRESS.

A genus of trees familiar to all for the beauty and gracefulness of their foliage. They bear seed abundantly, and can be propagated to any extent by this means. The seeds should be sown in February and March; but as they take some time to germinate, the pots in which they are sown should not be disturbed. Any soil suits them.

1. **C. torulosa.**—Native of Bootan; trees of this are not uncommon. 2. **C. sempervirens.**—The common variety generally met with in gardens. Native of Italy.

3. **C. funebris.**—WEEPING-CYPRESS.—Many plants of this species were sent by Mr. Fortune some years ago to the Gardens of the Agri-Horticultural Society, where they have thriven well, and may now be met with in almost every garden of any extent. He thus describes the tree as he found it growing in China :—

"About sixty feet high, with a stem as straight as that of a Norfolk Island Pine, and weeping branches like the Willow of St. Helena. It reminded me of some of those large and gorgeous chandeliers sometimes seen in theatres and public halls in Europe." *

Sir J. Paxton further observes :—"This is probably the most interesting coniferous plant yet in cultivation, and must in time displace the Weeping Willow."

Propagation by seed, which it bears abundantly. Also by cuttings. Most easy of culture; any soil suits it.

TAXACEÆ.

Salisburia.

S. adiantifolia.—Gingko of the Chinese; in its native region a tree of prodigious stature. Plants were introduced into the Calcutta Botanical Gardens a great many years ago, but remained in a very

* Fortune, 'Tea Districts,' p. 62.

unthriving state, never attaining to more than two or three feet in height; they have all since then perished, Dr. King tells me. Leaves the size of a man's hand, and, as the name denotes, resembling those of the Maiden-hair Fern; flowers said to resemble those of the common Berberry.

It would grow well on the hills, though I have not met with it there.

Taxus.

YEW-TREE.

T. Chinensis.—The only species, I believe, met with here.

Podocarpus.

Beautiful evergreen shrubs or small trees, with stiff linear leaves, of remarkably slow growth. Propagated easily by cuttings or layers during the rains. We have—**P. Chinensis**; 2. **P. elongatus**, of the two far the more graceful; and **P. latifolia.** They form fine ornaments when planted on lawns.

Dacrydium.

1. **D. taxifolium.**—Native of New Zealand, where it attains a height of 200 feet. It is a remarkably handsome plant when cultivated as a shrub, with most beautiful filigree character of foliage. Multiplied easily by cuttings during the rains.

2. **D. elatum.**—A most beautiful shrub, in foliage like the frond of the Onychium Fern. Cultivated in pots in this country, but rarely met with. Propagated by cuttings.

On the hills they must be grown under glazed shelter.

CASUARINACEÆ.

Casuarina.

C. muricata.—A lofty tree of rapid growth, common in most parts of India. The soft sighing of the air, on the stillest day, through its numberless slender branches is very agreeable, resembling the sound of the distant sea washing upon the shore. Unsuited to the garden except as a hedge, by being cut down to about five or six feet, and kept constantly clipt; it thus forms a dense beautiful bush, so changed in character as hardly to be recognised. It makes a capital avenue plant.

Propagated by seed during the rains.

Not met with on the hills.

SALICACEÆ.

Salix.

S. Babylonica—WEEPING WILLOW.—Thrives tolerably well in all parts of India, in situations where it receives a sufficient supply of water; but is often very short-lived, and, from some unknown cause, apt to die off very suddenly. Propagated readily by cuttings during the rains. Several other varieties also exist in an indigenous state in this country, but they are unsuited for a garden, not being sufficiently ornamental to entitle them to a place therein. The weeping variety is common enough on the hills.

ELÆAGNACEÆ.

Elæagnus.

1. **E. dulcis.**—A shrub of small size and erect growth; ornamental for its small oval-formed leaves, having a beautiful silvery hue on their under-surface. 2. **E. pungens.** 3. **E. variegata.** They are seldom met with; but are useful for decorative purposes. Propagated by cuttings of the young wood.

URTICACEÆ.

Urtica.

1. **U. pulchella.**—A small herbaceous shrub of beautiful foliage; leaves borne in a whorl on the summit of the stems, lanceolate, three or four inches long; of a pure deep green on the upper surface, and prettily netted over by the strong markings of the veins. The under-surface of a pure silvery-white hue.

2. **U. salicifolia.**—A low shrub; ornamental for the contrast of the dark-green of the upper surface of the willow-like leaves with the pure dead white of the lower.

Propagated by cuttings and seeds.

MORACEÆ.

Ficus.

1. **F. repens.**—INDIAN IVY.—Native of Assam; a lovely creeping plant with small verdant heart-shaped leaves, that covers a low wall in the shade or the trunk of a tree with a dense mantle of most re-

freshing green, attaching itself by means of its numerous rootlets in the manner of Ivy. Described as bearing fruit of about the size and form of an ordinary little Fig. Many buildings in Calcutta are entirely covered over with this plant. It must have lime for its growth.

2. **F. eburnea**: lately introduced, and resembling the last in growth.

Both the above are readily propagated by layers. They are not met with on the hills, and would not thrive there in the open air.

EUPHORBIACEÆ.

Pedilanthus.

P. tithymaloides—ADJUTANT'S HEDGE.—A roadside weed, with cylindrical succulent, stems, and dark-green thick fleshy leaves; bears small, crimson, misshapen, unattractive flowers. Sometimes used for the skirting of borders; should be kept closely clipt in.

Euphorbia.

1. **Eu. Bojeri.**—A small succulent, thorny-stemmed, cactus-like plant, always in blossom, but particularly in the hot season, with flat quadrangular, very symmetrical trusses of most brilliant vermilion flowers; requires a situation fully exposed to the sun, will grow nearly anywhere, but most thrivingly in a mixture of brick-rubbish, leaf-mould, and charcoal. Propagated by cuttings.

2. **Eu. splendens.**—Not to be distinguished in any very marked degree from the last, except that the stems are somewhat more slender and more spinous.

3. **Eu. jacquiniflora.**—A small shrub; in blossom one of the most brilliantly beautiful pot-plants of the gardens; blossoms in the middle of the cold season with a profusion of small, dazzling vermilion flowers from the extremity of, and all down its long, smooth, slender, twig-like stems. If some time before blossoming each stem be bent and fastened down over the rim of the pot, young shoots will break forth and enhance the beauty of the plant by the additional flowers they produce. After flowering the stems may be cut in, and the cuttings, when dry of the milky juice which exudes from the cut part, be put in a pot of sand in a shady place. In a short time they will take root. Some, however, consider that cuttings strike more readily if made in the cold weather, before the plants have flowered. The plants are very apt to die off in the rains if left much exposed to wet.

The late Mr. R. Scott, of the Calcutta Botanical Gardens, raised a dwarf and very distinct permanent variety of this beautiful plant. The

announcement of it I give in his own words from the 'Journal of the Agri-Horticultural Society':—

"Two years ago, at one of the shows of the Agri-Horticultural Society, I saw a plant of Euphorbia jacquiniflora, with branches about seven feet long, and said to have been the growth of one season. The accompanying plants show what may be accomplished in the opposite direction, are ten months old, from cutting, and as the appearance bespeaks, have been starved as long as could be done with safety to the plants, which have been allowed to 'form' themselves. No stopping, pruning, or bending of the branches or twigs has been practised upon them."

Poinsettia.

P. pulcherrima.—A very large spreading shrub, eight to ten feet high; native of Mexico; bears during all the cold season little knobs of yellow insignificant flowers of the size of a Pea, surrounded by rays of large, elliptical, crimson-scarlet, bracteal leaves. When in full blossom one of the most gorgeous objects conceivable. Blossoms upon the wood of the current year, which should be cut in to a bud or two from the base after flowering. No plant strikes more readily from cuttings. **P. pulcherrima,** *var.* **albida.**—A variety with the bracteal leaves of a greenish-white; of little beauty comparatively.

Dalechampia.

D. Roezleana rosea, of late introduction, and **D. Madagascarensis**; slender, pretty climbing plants. They bear insignificant greenish flowers, surrounded by bractial leaves of a beautiful colour, and veined with green. Propagated by cuttings in the cold season.

Excœcaria.

E. bicolor.—A shrub of moderate size, and in respect of its foliage one of the most beautiful of the garden. Leaves lanceolate, four or five inches long, of a bright olive-green on their upper surface, and of a rich deep crimson beneath; bears in the cold weather minute insignificant flowers. A sprig or two produces a fine effect in a bouquet. Propagated readily by cuttings during the rains.

Acalypha.

1. **A. densiflora.**—A shrub about two feet high, of recent introduction; has oval pointed leaves, and bears during the year throughout drooping festoons, ten inches or a foot long, of pale, bright-red, minute flowers, altogether similar in form to those of Love-lies-bleeding. Propagated readily by cuttings or by division during the rains. **A. trico-**

lor; **A glabrata**; **A marginata**; are remarkable for the beauty of their leaves. **A tricolor** grows from six to ten feet high, with leaves blotched, mottled, and splashed with red and crimson on coppery-green ground. The following, which are all cultivated for the beauty of their foliage, have been recently introduced —**A illustrata**, **Macafeeana**, **Macrophylla**, **Musaica**, and **obovata** The last named is an evergreen shrub of fine dense growth, and is largely used for decorative purposes in Calcutta.

Jatropha

1. **J multifida**—PHYSIC NUT—CORAL PLANT.—A very common large herbaceous shrub, rather ornamental when kept down to a moderate size, foliage rather pretty, with large, much-slit, vivid bluish-green leaves, above which rise the bunches of small flowers somewhat resembling pieces of red coral Propagated by the large nuts, which it bears abundantly.

2. **J. panduræfolia.**—A beautiful flowering shrub, of moderate size, with dark shining fiddle-formed leaves, met with in nearly every Indian garden, bears during the hot and rain seasons panicles of middling-sized, bright-crimson flowers; requires to be severely pruned in the cold season to prevent it from becoming scraggy, propagated readily by cuttings or by seed, which it ripens in the cold season. A variety is not uncommon with rose-coloured flowers, found rather shy sometimes of opening its blossoms.

3. **J. integerrima.**—A species, in the Calcutta Botanical Gardens, in all respects very similar to the last, except in the form of the leaf.

Ricinus

R communis—PALMA CHRISTI—CASTOR-OIL PLANT—*Rêndee.*—A large herbaceous shrub, common in waste places in all parts of India. The variety with scarlet blossoms, contrasting finely with the rich green, large palmate leaves, would set off any out-of-the-way or unoccupied spot of the garden to great advantage. Propagated by seed

Croton.

A genus of handsome, ornamental leaved plants, natives chiefly of the Moluccas, but perfectly naturalized in this country During recent years they have risen greatly in popular favour for decorative purposes—and deservedly, for any thing more beautiful and varied in the colouring of the leaves of these plants it is impossible to conceive. A single plant in the various stages of its growth will exhibit such a variety of tints and distribution of colour as to puzzle even an experienced cultivator as to its identity—for there are over 300 varieties in cultiva-

tion, all named. For gardens of modern extent, about fifty of the best kinds will be found quite sufficient, and these should be of distinct habit and coloration of the leaves. It will, however, be found that, to select even so large a number as fifty, the task will be no easy one, for every individual variety possesses charms which renders it particularly desirable to include it in the fifty.

Crotons are very easy of culture, and are perhaps the hardiest of our decorative plants. They will thrive and make good growth in almost any soil and under the most unfavourable conditions. But to grow them to perfection, so as to develope to the fullest extent the gorgeous colouring of their leaves, they must have almost absolute shade. Our grass conservatories are admirably adapted for this purpose. It is here that they are seen at their best. They make splendid potted plants; but obviously they grow best in the ground, where the roots have greater freedom. No one, however, need expect to cultivate Crotons successfully unless efficient drainage has been provided in pots. If it is only borne in mind that plants, like animals, can only absorb and assimilate a certain amount of food, which the roots take up in the form of moisture : and that anything beyond their proper requirements *must* prove injurious to the health of the plants, the question of thorough drainage would be better understood, and more rigidly enforced in the case of *all* plants. Unless the drainage is efficient, the soil becomes water-logged, sodden, and sour, because the plant is *unable to assimilate* such a quantity of moisture. In the case of Crotons, water-logging means certain death of the plant in a short time.

Any common garden soil will grow Crotons; but that which suits them best is made up as follows :—One part well-decayed cow-dung, one part leaf-mould, one part garden loam, half part river sand, and half part old mortar or concrete, broken up fine, like coarse *soorkee*. They will come to great perfection in this.

The best mode of propagation is by cuttings put down in the rains, in pure river sand, (they root quickest in pure sand). In a month or six weeks they will have formed a lot of roots, and the young plants should then be potted off singly in two and three inch pots, in which they should be allowed to remain until the pots are filled with roots, when they should be moved into pots a size larger until the end of the following February.

The plants begin to make their new growth about the end of February or beginning of March, according as the season is early or late. They should at this time, *i.e.*, just before they begin to put forth new leaves, be repotted into entirely fresh soil. They should be liberally supplied with water at this time, and during the whole of the hot summer months. An occasional application of liquid manure—say, once a week—will benefit them immensely. By this mode of treatment

the plants remain compact and bushy, and do not run into "leg," as is too often the case with Crotons left to themselves. The soil around the roots should be stirred up at least twice a week. If done in the morning, the plants should not be watered till evening. This is a very essential operation for the successful cultivation of plants in pots.

On the hills Crotons must be grown under glass. In all other respects the treatment recommended for the plains, is equally applicable on the hills.

It would become tedious to describe all the Crotons in cultivation; and, moreover, would serve no useful purpose. It has therefore been considered sufficient to give the names of fifty of the best varieties, (in the estimation of the writer of these remarks), which will be found suited for general purposes, whether for decorative or exhibition purposes.

Mr. S. P. Chatterjee, Nurseryman, of Calcutta, has perhaps the best and largest collection of Crotons in India. He has introduced many new varieties from the South Sea Islands, and has also been successful in raising some beautiful varieties by hybridization. All those named below may be seen growing to great perfection amongst his extensive collection :—

Alexandra.
Aucubœfolious-giganteus.
Aucubœfolious-superbus.
Aureo-marmoratus.
Aureo-spiralis.
Bachii.
Bergmanii.
Beauty.
Brageeanus.
Challenger.
Cronstadtii.
Chrysopœcilus.
Dayspring.
Duchess of Edinburgh.
Duke of Albany.
Fenzii.
Fijiensis.
Gloriosus.
Gordonii.
Grande.
Imperator.
Imperatrice Eugenie.
Indian Prince.
Kingianus.
Lindenii.
Little gem.
Lowii.
Macafeeanus.
Macarthuri.
Magnificum.
Maharaja of Durbhanga.
Mariesii.
Mooreanus.
Morii.
Mutabilis.
Pink Pearl.
Prince of Orange.
Prince of Wales.
Rubro-marginata.
Rubro-vittatus.
Schomburgkiana.
Sir Ashley Eden.
Sir Richard Garth.
Sir W. MacArthur.
Sunset.
The Czar.
Thomsonii.
Variabilis.
Warrenii.
Westii.

Xylophylla.

1. **X. elongata.**—A curious and very ornamental small shrub, with small lanceolate leaves, along the edges of which are borne the minute pale-green flowers, upon short footstalks as fine as hair; nearly always in flower, but more particularly so in October and November, when it is densely covered with its mealy-looking blossoms, which diffuse for some distance around a smell like that of seed-cake. Propagated by cuttings in the rains.

2. **X. angustifolia.**—In nearly every respect similar to the last, but of dwarfer growth; ripens seed abundantly in November.

Eriococcus.

1. **E. glaucescens.**—A small shrub, rather pretty, and curious for bearing its minute flowers upon hair-like stems along the edges of the leaves, like those of the preceding genus.

2. **E. sp.**—An unnamed species in the Calcutta Botanical Gardens, somewhat similar to the last, but not so pleasing a plant.

Buxus.

1. **B. sempervirens.**—Common Edging-Box of the English gardens. Two or three stunted specimens in small pots just manage to exist, and that is all, in the Calcutta Botanical Gardens.

2. **B. Chinensis.**—Somewhat similar to the preceding; thrives tolerably well here, and possibly might answer for forming an edging if kept constantly clipt in.

NEPENTHACEÆ.

Nepenthes.

PITCHER-PLANT.

The several species of Pitcher-plants are natives principally of Sumatra and the Straits; and though occasionally introduced into the Calcutta Gardens, seldom seem to survive long in the climate of that locality. The flowers they bear are small and uninteresting. Their ornamental character consists wholly in their curiously-formed leaves, some of which end in a tendril, bearing at its extremity a pitcher, in some species coloured most gorgeously. Sir J. Paxton says:—"They require slight shade, heat, and moisture, and thrive best potted in

chopped moss, which must be kept constantly moist." They may be propagated, it is said, by cuttings, layers, and seeds.

N. distillatoria.—Native of Singapore; bears cylindrical pitchers of the same colour exactly as the leaves. A large plant of this species, trained upon a trellis, planted in the ground beneath the shade of trees, was thriving well in the Calcutta Botanical Gardens, but it went off suddenly and perished. They thrive tolerably well in our grass conservations. There have been several other varieties introduced lately, among which the following may be noted as worthy of cultivation:—**N. gracilis**; **lævis**; **Rafflesiana insignis**; and **Sedenii**.

LARDIZABALACEÆ.

Akebia.

A. quinata.—A twining shrub, native of China, with pleasing foliage of rich green, small, elliptical leaves, arranged five in a group; introduced from China by Mr. Fortune, who describes it as bearing dark brown flowers, not unlike those of Magnolia fuscata, and very sweet-scented. As figured in the 'Botanical Register,' the flowers are without petals, have three sepals, and are borne in loose racemes. Thriving plants have for some years past been growing in the Calcutta Botanical Gardens. It is said that it dreads humidity.

BEGONIACEÆ.

Begonia.

ELEPHANT'S EAR.

A very extensive genus of handsome leaved-plants, distributed over a wide area. Many of the most beautiful species are natives of the Eastern Himalayas, extending as far as Simla. In Sikkhim, the Khassya mountains, the valleys of Darjeeling, and in Assam many very beautiful varieties have been found and brought under cultivation. Many fine species have been introduced from tropical South America, especially Brazil. But by far the greatest number of our cultivated varieties, which are remarkable for the exceeding beauty of their leaves, have been raised by hybridization.

In England and on the continent Begonias are divided into three distinct groups: 1. Those remarkable chiefly for the beauty of their

leaves, and the flowers of which are insignificant, and therefore of no account. 2. The handsome large-flowered varieties, in which the leaves are mostly plain and of no account; and 3. The tuberous-rooted flowering varieties. which are very similar to the last, except that they have tuberous roots. The two last-named are not found to grow to perfection on the plains; but succeed remarkably well on the hills, where indeed the other—the ornamental-leaved varieties,—also come to great perfection. The first named succeed admirably in our grass conservatories, and even under the shelter of a verandah, and are the ones most generally cultivated on the plains. Those varieties from Sikkhim, the Khassyas, Darjeeling and Assam, also grow luxuriantly in grass conservatories.

To grow Begonias to perfection, a porous soil is absolutely necessary. Their roots are exceedingly fine and delicate, and *remain mostly on the surface.* This fact should be borne in mind. The best way is to fill a pot half full of crocks for drainage; then fill in with a soil composed of well-decayed leaf mould and river sand in equal parts, with sufficient old mortar or concrete broken to the size of hazel-nuts, to render the soil porous. In this plant the Begonia, and place round it large pieces of old mortar, so that the leaves will rest on them, and not touch the soil. Treated in this way they will come to great perfection. Begonias are admirably suited for hanging baskets, intermixed with Ferns, Cyrtodeiras, and other dwarf foliage plants; while for rockeries they are unrivalled. They are impatient of too much moisture round the roots; hence the importance of very thorough drainage.

They are very easy of propagation, cuttings strike most readily, while a single leaf imbedded in pure sand kept well watered, and covered with a bell-glass, will yield two or three plants. The best time to propagate is during the rains, when a large stock of plants may be raised.

There are over two hundred varieties in cultivation of all classes. The following were fully described in the last edition of this work, and being favourites still, they have been allowed to stand :—

1. **B. argyrostigma.**—A small, remarkably handsome plant; leaves on the upper surface of a dark bright green, distinctly dotted over with numerous spots of silver; and underneath of a flesh or dull-red colour: bears in April greenish white flowers of moderate size. It is principally the lowermost leaves that are most marked with silver spots; when the plant is growing with much vigour, the uppermost ones often lose them altogether.

2. **B. hydrocotylifolia.**—A very pretty species, with thick succulent scaly stems, which lie prostrate upon the earth, concealed beneath the abundance of handsome foliage of kidney-formed polished-green leaves of moderate size, prettily clouded with the markings of

the nerves showing black. The under surface of the leaf of a pale Indian-red colour; sends up in February slender flower-stems of the thickness of a tobacco-pipe, bearing a profusion of middling-sized, pretty, delicate, rose-colonred flowers.

3. **B. hydrocotylifolia,** *var.* **manicata.**—A remarkably handsome plant, and a delightful decoration to the verandah; habit the same as that of the above; but with much thicker stems, and leaves full four times as large, with the markings of the veins white both on the upper and under surface, supported upon long brittle footstalks. An object of especial beauty when in full blossom, with its numerous pretty flesh coloured flowers.

The leaves have a great tendency to rot with the wet; and the plant seems to thrive the better for being left unwatered for long intervals of time. Most easily propagated. A single leaf with its footstalk broken short off, with its heel, at the stem, and inserted in sand with a handglass over it, will in a very short time become a rooted plant. I have thus in about eight months from a single leaf produced a plant of the largest growth.

4. **B. Malabathrica.**—A plant about fifteen inches high with elliptical, pointed leaves, five inches long, of a rich polished green, rendered uneven by their numerous hair-bearing pimples; blossoms in March.

5. **B. nitida**—A small plant; beautiful for the brilliant freshness of its pure green leaves: apt to die down in the rains, but on the approach of the cold season springs up again and recovers itself; bears livid white flowers of middling size.

6. **B. humilis.**—A small insignificant plant, with much of the character of **B. Malabathrica**; bears small insignificant flowers; little better than a mere weed.

7. **B. platanifolia.**—A plant about two feet in height, with very handsome leaves, like those of the Plane-tree; bears in November rather large pretty white flowers; exists apparently in this climate with some difficulty, as it is rarely seen but in a sickly, unthriving condition.

8. **B. reniformis.**—A very handsome plant: very hardy; will thrive well in a shady place in the border, and grow vigorously to as much as three or four feet in height. Flowers very small, but in immense number in large, dense, silvery heads which contrast most beautifully with the rich pure green of the angular-edged leaves; as do likewise the pendulous bunches of white seed-vessels which succeed them.

9. **B. fuchsioides.**—A small plant of singular beauty; not uncommon at Ootacamund, whence I brought down plants to Howrah, but they lived only a very short time; bears drooping bunches of

bright red flowers, similar to those of the Fuchsia, for which it might be easily mistaken at a short distance. Flowering specimens have been exhibited at the shows of the Agri-Horticultural Society, but whether they existed through the Hot and Rain seasons I am not aware.

01. **B. longipila.**—Native of Mexico; found in some of the Calcutta collections; a handsome species with prostrate stems and large leaves, covered with long hairs, and deeply cut like those of the Castor-oil plant, of a dead blackish-green, prettily marked with clear green along the nerves; described as bearing clusters of numerous large rosy-white flowers.

11. **B. rex.**—One of the commonest of our ornamental-leaved varieties, and the parent of a great many hybrids. Thrives to perfection in grass conservatories.

12. **B. rubrovenia.**—A small plant of recent introduction into our gardens, where it thrives well in the grass conservatory. Leaves oval, pointed; the upper surface mealy-white, except the veins, which are dark green; under surface and stems deep red.

The following are among the handsomest of the new varieties. Many of these have been raised by hybridization at Calcutta, and at Durbhunga, by Mr. Charles Maries, F.L.S., lately Gardener to the Maharaja of Durbhunga:—**Annica; argentea; Count Alfred Lemange; Diadema; Gogoensis; Imperialis; Isadora Leroy; Jacksonii; La Perle de Paris; Le Shah; Lowii; Madame H. Gache; Marshalli; Marquis de Nadaillac; Moonlight; Mrs. Larmour; albia; Pearl; Prince of Wales; Queen Victoria; Sikkimensis variegata; Splendens; Starlight; Thomsonii; Voie lacte; White Queen, Zointhiana,** and some of the unnamed Singapore, Chittagong, and Sikkhim varieties.

FLACOURTIACEÆ.

Bixa.

B. Orellana.—ARNOTTO-TREE.—A small, rather common tree, the seed of which yields the well-known Arnotto dye; has dense handsome foliage, with large heart-shaped leaves; bears in great profusion, towards the end of the rains, panicles of remarkably beautiful flowers, resembling large peach-blossoms: if pruned and kept of moderate size, an ornamental plant at all times: easily propagated from seed sown in the rains. Roxburgh says the variety that bears white flowers is a native of this country, but that in plants reared from West India seed the flowers are rose-coloured.

PASSIFLORACEÆ.

Passiflora.

PASSION-FLOWER.

The different species of Passion-flower met with in our Indian gardens are rather numerous. Many, however, seem little disposed to bloom; and some five or six, perhaps, the flowers of which are of exquisite beauty, are as many as are of any value in an ornamental point of view. They are tendril-bearing climbers; natives principally of South America and the West Indies, and require a trellis for their support. "They grow," it is said, "with great rapidity; but soon exhaust the soil, and thus become injurious to plants in their neighbourhood; whether therefore grown in pots or in the open ground, they require often a new soil. The branches should be cut in closely each year after flowering." * It is therefore necessary to plant them in a rich soil. They produce their flowers upon the wood of the current year; and Sir J. Paxton recommends that they should be pruned in the manner of a vine; that is, that the stems should be shortened to two or three eyes off the old wood. He states, moreover, as does Mackintosh † too, the curious fact, that left to themselves they are shy of setting fruit; but that they do so readily when impregnated with the pollen of other species in preference to their own. P. racemosa does so with pollen of P. alata. Nearly all are easily propagated by cuttings and layers.

1. **P. adiantifolia.**—A small slender plant in the Calcutta Botanical Gardens, the flowers of which I am unacquainted with.

2. **P. alata.**—Flowers very fragrant, with calyx and petals crimson; rays variegated, white purple, and crimson. A very shy bloomer.

3. **P. Buonaparteana.**—Sir J. Paxton says is a synonym of P. quadrangularis.

4. **P. Chinensis.**—Flowers described as white and blue.

5. **P. cærulea.**—The most common, and certainly one of the handsomest of all; a very stout, extensively growing plant, with bright three-lobed leaves, covering a great space of wall or trellis; bears abundantly during the rainy season large flowers with the segments of the calyx and petals pale greenish-white; styles purplish; rays of the crown purple at the bottom, white in the middle, blue at the end. Most readily propagated by the numerous young suckers it sends up for a great distance round the spot where it grows.

6. **P. cæruleo-racemosa.**—A hybrid between the two species whose names it bears: flowers very large and handsome, though not

* 'L Bon, Jardinier' pour 1866, p. 636. † 'Greenhouse,' p. 104.

very brilliant, being of a pale lilac colour, prettily relieved with a pure white crown of rays. Cultivated in a large pot, it continues constantly in bloom. It should be repotted with fresh soil annually in the cold weather.

7. **P. edulis.**—Flowers described as white fringed with purple, fragrant, but of no great beauty.

8. **P. fœtida**—LOVE-IN-A-MIST.—A plant of slender habit: flowers small, white, and unpretending. Ornamental for its delicate and densely growing foliage, which, when bruised, emits a very sickly, disagreeable smell. Bears fruit abundantly, resembling small green Gooseberries.

9. **P. Gontierii.**—A hybrid variety of late introduction, bears flowers hardly to be distinguished from those of P. Middletoniana.

10. **P. holosericea.**—An extensive climber: leaves, formed of three blunt lobes, pretty for the marking of their dull-red veins. Flowers of a tawny colour, not very large, but borne in great profusion, having a strong smell of honey.

11. **P. incarnata.**—Described as "a pretty thing of semi-herbaceous habit; flowers pink." Formerly in Calcutta Botanical Gardens, but since lost.

12. **P. kermesina.**—A slender-stemmed extensive climber, with three-lobed leaves, having large ear-like stipules. Flowers of moderate size, of a fine carmine crimson, display themselves only where sheltered from the sun. A common plant in the gardens about Calcutta, where it blossoms almost perpetually through the hot and rain seasons. Sir J Paxton says of it, "beyond all comparison the most beautiful species in cultivation except P. racemosa."

13. **P. laurifolia.**—A powerful, extensive, and rampant climber, with dense handsome foliage, of rich-green, glossy, laurel-like leaves, and fine large blue fragrant flowers.

14. **P. Loudoni.**—Bears brilliant crimson flowers. One of the choicest of the species, but altogether unknown in this country, I believe.

15. **P. lunata.**—A most extensive climber, remarkable for its curious crescent-formed leaves; bears constantly in great profusion early in the morning greenish-yellow flowers of moderate size. Of no great merit.

16. **P. Middletoniana.**—A handsome species with fine red-and-green three-lobed leaves; bears in May very large, exquisitely beautiful flowers, bright azure-blue with rings of pure white, and of a fine fragrance.

17. **P. minima.**—Flowers small and insignificant, succeeded by dark-blue berries much like Sloes: a mere weed.

18. **P. princeps.**—A handsome species, bearing scarlet flowers; has been introduced into this country, but found unable to endure the climate.

19. **P punctata.**—Bears greenish-white flowers of moderate size, and is only interesting for its foliage of curious two-pronged leaves.

20. **P. quadrangularis or Buonaparteana.**—Mentioned as "a superb species with flowers of a most superb colour." A strong woody climber, with stout quadrangular stems and large heart-shaped leaves, seven or eight inches across; not uncommon in the gardens about Calcutta, where it blossoms during the rains. Sir J. Paxton says, that in France it is grafted upon **P. cærulea**, and flowers and fruits the same season as grafted, when not above two feet high.

21. **P. racemosa.**—This very choice and handsome plant bears deep-red or scarlet flowers in March. It thrives very indifferently in this climate, and can only be propagated by grafting upon a stronger species.

22. **P. rotundifolia.**—Bears pale-green insignificant flowers; an uninteresting plant.

23. **P. serratifolia.**—Bears in May large, very handsome, lavender-coloured flowers.

To these have of late been added, **P. trifasciata, mutabillis, macrocarpa, Harrisiana, Madonna, Imperatrice Eugenie, Comtesse Ginglini, Constance Elliott,** and **fulgens.** The **P. trifasciata** is remarkable for its handsome foliage which forms a conspicuous object in the plant house when trained up the supports.

Murucuja.

M. ocellata.—A most ornamental climbing shrub, native of the West Indies, beautiful if only for its very handsome curtain of foliage, which entirely conceals whatever support it is trained to with its densely-crowded, curious, transversely-oval leaves; bears during the whole of the cold months a profusion of beautiful crimson flowers of moderate size, much like those of the Passion-flower; succeeded by a crop of small purple berries. Propagated by layers and seed, the latter sown in February.

Tacsonia.

A genus of climbing plants in most respects very similar to the Passion-flower; but not, perhaps, so handsome. They are not found to grow satisfactorily in the plains of India.

1. **T. pinnatistipula.**—Plants of this species have been introduced into the Calcutta Botanical Gardens, but, as I understand, soon died off.

2. **P. mollissima.**—This thrives well, and produces fruit abundantly at Ootacamund, whence plants brought down to Calcutta soon perished. **T. Exoniensis** is, perhaps, the only variety that does well in the plains.

VIOLACEÆ.

Viola.

1. **V. odorata**—SWEET-SCENTED VIOLET.—Of this old familiar flower many varieties are cultivated in Europe, both single and double; but in this country I have seen none but the commonest single kind. Plants are easily raised from seed in October, and if during the intervening months sheltered from sun and rain, neither of which they can bear in excess, and repotted in the following October, will blossom in the cold weather.

2. **V. cucullata.**—This, and the two following, which much resemble the preceding, and blossom likewise in the cold weather, require little care to be taken of them, but are not much valued from the flowers being entirely scentless. Propagated by division of the roots.

3. **V. primulæfolia.**

4. **V. serpens.**—Bears small white flowers of little interest; but the plant is pretty for its peculiar heart-shaped, pointed leaves.

5. **V. tricolor.**—HEARTSEASE—PANSY.—As this plant canno exist during the hot and rain seasons of this country, it must be treated simply as an annual in the cold season.

On the hills sow the seed in March.

TAMARICACEÆ.

Tamarix.

1. **T. Gallica,** *var* **Indica**—TAMARISK—*Jâu*—*Pharâs.*—A native of Europe, as well as of this country, in the northern parts of which it covers large districts as a common jungul shrub; and is much in use with the natives for making baskets: very graceful and feather-like in its growth; particularly pleasing when in blossom, and covered with its numberless little spikes of small pink flowers.

2. **T. dioica.**—A native also of this country: a very graceful and ornamental shrub, of light feather-branches, somewhat resembling the Casuarina; exceedingly pleasing when in full blossom, as it nearly always is, with its little stems terminating in a spike of small lilac flowers. Propagated by cuttings in the rains.

CRASSULACEÆ.

Crassula.

C. nitida and **C. miniata.**—Small herbaceous pot-plants of a succulent nature, very showy and beautiful when in flower, with their trusses of crimson blossom, much like that of a Phlox. I brought down plants from Ootacamund, where they thrive well, but found them unable to exist in the climate of the plains, as is indeed the case with the majority of plants of this description, natives of the Cape. They do well on the hills.

Kalanchoe.

1. **K. heterophylla.**—An herbaceous plant with thick succulent leaves, weedy-looking, and hardly suited for the garden, though somewhat cheerful when in blossom in February with its bright yellow oxalis-like flowers.
2. **K. laciniata,** and
3. **K. varians.**—Much the same kind of plant as the preceding, but somewhat different in the form and divided character of the leaves. Propagated by cuttings put down in October.

Bryophyllum.

B. calycinum.—An herbaceous plant, in some places found growing common by the wayside; well known for the curious property its thick succulent leaves have of throwing out roots and soon becoming young plants by merely lying upon the surface of the damp ground; very ornamental when in blossom in February, with its numerous large globular-formed flowers of pale-green tinged with red, drooping prettily like little bells from their erect flower-stem.

TURNERACEÆ.

Turnera.

1. **T. trioniflora.**—A small herbaceous shrub, native of Brazil, with oval dull-green leaves two inches long; bears, mostly in the cold season, large, cistus-like, sparkling, cream-white flowers, with dark purple-eye. Propagated by division.
2. **T. ulmifolia.**—Of the same size as the last; bears its lanceolate shining leaves crowded on the summit of the stems, above which are borne at all seasons its large dull-yellow flowers; met with growing out of old walls about Calcutta.

CISTACEÆ.

Cistus.

C. ladaniferus—GUM-CISTUS.—Neither this handsome shrub of the English gardens, nor any other species of Cistus, exists in India.

Cochlospermum.

This genus is now placed by Bentham and Hooker under Flacourtiaceæ.

C. Gossypium—A native of India. Dr. Roxburgh calls this "a large beautiful tree." The numerous large yellow expanded flowers it produces in March and April, when it is perfectly leafless, are handsome in themselves, but not sufficiently so to compensate at the time for the ugliness of the great bare unsightly stems.

Propagated by cuttings and seed during the rains.

BRASSICACEÆ.

Cheiranthus.

C. Cheiri—WALLFLOWER.—No Wallflower worthy of notice is ever seen in gardens about Calcutta; plants raised from country seed produce poor weedy flowers; those raised from imported seed, and kept over from one cold season to another, never blossom at all, though in the North-West Provinces they blossom freely enough, some bearing fine double flowers.

On the hills it comes to perfection, and is treated as a perennial. Sow the seed in March.

CAPPARIDACEÆ.

Capparis.

1. **C. horrida.**—An extensively straggling thorny shrub. The young shoots and leaves have a rich, glossy, chestnut-coloured tinge, contrasting beautifully with the numerous large white tassel-formed flowers, borne in February and March. Unsuited for the garden, but might be ornamental, used as a hedge, for which it is well adapted, being quite impenetrable.

2. **C. tryphylla.**—A remarkably pretty, compact, bushy, small shrub, with round-oval, rigid, deep-green leaves, an inch long; ornamental only for its foliage; as here, I believe, it produces no flowers.

STERCULIACEÆ.

Helicteres.

H. Isora—SCREW-TREE.—A small tree of no beauty, either for its foliage or the small pale red flowers it bears, but interesting for the curious screw-like form in which the seed-pods twist round each other. The milk of this species yields a kind of rubber. Propagated by seed in the rains.

Sterculia.

S. coccinea.—A small tree, with rich, showy foliage of lanceolate leaves, very ornamental when, about the end of May, the large velvety, deep crimson-scarlet seed-vessels split open, and disclose the small, purple, prune-like seeds attached to them.

Propagated by seed in the rains.

Neither of the above are suited for the hills.

BYTTNERIACEÆ.

Abroma.

A. augusta.—A shrub of considerable size, with large, roundish, cordate leaves, of a dark sombre green; bears in the rains large, pendulous, eardrop-like, dull, blood-coloured flowers, succeeded by large, curious five-winged capsules. A character of gloom pervades the whole plant, contrasting pleasingly with the many other of the gay things of the garden, though perhaps hardly ornamental enough to entitle it to the large space it takes up. Propagated by seed. Not suited for the hills.

Dombeya.

A genus of very large plump-formed shrubs, mostly natives of Bourbon; they take up a great deal of room, are coarse-looking, and only ornamental when in blossom, being then one entire mass of colour, from their numberless corymbs of middle-sized flowers, each by itself not very pretty. Propagated only by layering.

1. **D. palmata.**—Has seven-lobed, palmate, smooth, glossy-green leaves; bears in November greenish-white scentless flowers.

2. **D. cuspidata.**—Has rough three-lobed leaves, longer than broad; bears in September pinkish scentless flowers.

3. **D. acutangula.**—Leaves three-lobed, larger than those of the last, as broad as long; bears in December and January hydrangea-like corymbs of largish, round-petalled, pink-blush flowers, with a faint hawthorn-blossom-like scent.

4. **D. viburnifolia.**—Leaves similar in form to those of the last, but larger, covered with soft hairs; bears in January densely-crowded corymbs of white narrow-petalled flowers, with an agreeable hawthorn-blossom fragrance.

5. **D. tiliæfolia.**—Leaves heart-shaped and pointed; bears in the cold season sweet-scented rose-coloured flowers; a smaller shrub and less easy of propagation than any of the preceding.

Astrapæa.

A. Wallichii.—Native of Madagascar; a tree of from twenty to thirty feet in height, but plants will blossom when only two or three feet high; has very large, roundish, heart-shaped, rough coarse leaves; bears in February, on long pendulous footstalks, large compact bundles of small deeply rose-coloured flowers with yellow anthers. The flowers hang with their faces downwards, and, on small plants, can only be seen by being lifted up for inspection. Both Don and Sir J. Paxton say of it, that it is "one of the finest plants ever introduced into Britain, and that when in flower nothing can exceed it in beauty." It is not every one, perhaps, who will concur in this opinion. To me the beauty of the flowers seems of a very tawdry description. It requires a good soil and a shady situation. Mr. Ellis says, "in its native home it always luxuriates on the banks of a stream, or grows near water."* Propagated by layers, which take a very long time to root. Not suited for the hills.

Pterospermum.

P. lanceæfolium.—A large tree, native of Assam, with lancehead-like leaves of a tawny russet colour, with the under surface dead-white; bears in the hot season large white fragrant flowers; a small tree in the garden is a very ornamental object, for the striking peculiarity of its dense handsome foliage. Propagated by cuttings in the rains. Not suited for the hills.

TROPŒOLACEÆ.

Tropœolum.

None of the perennial species of this genus of beautifully flowering plants will endure the heat of the plains.

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* 'Madagascar,' p. 295.

MALVACEÆ.

Althæa.

A. rosea—HOLLYHOCK—*Gool-khaira.*—It is questionable whether this familiar biennial, except for old association, is worthy of cultivation in this country, as it produces here generally only single flowers, and those mostly of one colour—pink—and not the splendid double ones which render it so fine an ornament to gardens in England. Dr. Bonavia of Lucknow, has, however, lately brought to notice, that by sowing the seed of some semi-double pink ones, in two years he has obtained all the varieties one could desire, from white to prune-colour, and many of them as double as they are in Europe.* The seed should be sown in October, and—as the seedlings suffer severely from being transplanted—in the bed where the plants are intended to remain. The plants will sometimes blossom the same season, or continue on till the following one, and blossom then. In the latter case, however, many will most probably perish in the rains.

On the hills they come to great perfection. The seed should be sown in March.

Urena.

U. lobata.—A small shrub, with roundish leaves, of so harsh and coarse a character, as all but to outweigh the beauty of the little rose-coloured flowers it bears in the hot season. Propagated by cuttings in the rains.

Hibiscus.

The gardens of India are very rich in the number of handsome species of this genus that they contain. But although nearly all are very beautiful, there is not sufficient diversity of character in many to make it worth while to cultivate more than a select few. Most of them are very easily propagated by cuttings or by seed and don't require any particular treatment, although any little care bestowed upon them is amply rewarded by a richer display of blossoms.

1. **H. mutabilis.**—CHANGEABLE ROSE—*Gool-i-ujâib.*—A very common large bushy shrub, eight feet high, with large heart-shaped downy leaves; bears in October and November, in constant succession, a profusion of large very handsome double flowers, somewhat like immense double Roses; white on first opening, then becoming cream-coloured, and finally of a deep rose tint. A most showy plant during the time it is in blossom; propagated by cuttings. The single-flowered kind, raised usually from seed, is not deserving a place in the garden.

* 'Journal of the Agri.-Hort. Society,' vol. xiv, p. 14.

2. **H. tortuosus**—*Bâlâ.*—A middling-sized tree : bears in February large bright, primrose-coloured flowers, with a rich puce-coloured centre, changing after they have been some time open entirely to crimson ; very beautiful when in full blossom and covered with flowers, some so different in colour from others as to seem hardly to belong to the same plant.

3. **H. collinus.**—A small tree, with spreading branches and three-lobed, heart-shaped, smooth leaves ; bears towards the end of the year large, full-expanding, pale rose-coloured flowers, with dark puce-coloured eye ; most ornamental when in blossom, the flowers, relieved against the rich green foliage, presenting quite a dazzling appearance.

4. **H. Lampas.**—A largish tree with heart-shaped leaves ; bears deep primrose flowers with a dark purple eye ; a very common tree at Madras, planted along the road-side.

5. **H. heterophyllus.**—A small tree with long narrow leaves ; very ornamental when grown of a small size ; bears during the hot season largish flowers of the palest primrose colour, almost pure white, with the edges prettily pencilled with pink, and with a dark-coloured eye.

6. **H. A. Syriacus**—*Gurhul.*—A bushy shrub four or five feet high, very common in gardens in all parts of India ; leaves towards the base wedge-shaped, towards the apex three-lobed ; bears during the hot and rain-seasons large lilac-blue flowers with dark purple eye. In the cold season the wood of the past year should be well cut in.

α. A variety with double flowers of the same colour.

β. A variety also with double white flowers ; but this, from some unassignable cause, is rarely seen to blossom in a thriving condition.

γ. A variety likewise, the handsomest far of any, with leaves somewhat larger, and double pure-white flowers with fine dark crimson eye.

7. **H. Rosa Sinensis**—CHINESE SHOE-PLANT—*Juwâ.*—A wider-spreading and more diffuse-growing shrub than the last, with much more agreeable character of foliage ; leaves ovate, ending in a prolonged point, saw-edged, but not lobed ; in almost constant blossom with its brilliant crimson-scarlet flowers, with the long pretty column of pistil and stamens projecting from their centre. Never known to produce seed here.

α. A magnificent variety, with flowers full four times the usual size, I saw in blossom at Bangalore ; lately introduced, I was told, from Kew.

β. A variety is common with double flowers, but in my estimation not so pleasing as the one bearing single flowers.

γ. A variety also is met with having pale, straw-coloured double flowers.

δ. A variety also with double salmon-coloured flowers with crimson centre.

Recent additional varieties are : ρ **albo-variegata** ; δ **cruenta** ; η **miniata semiplena** ; θ **rubra plena** ; ε **spinulosa.**

8. **H. liliiflorus.**—A shrub of the same size as the two preceding, but of more tree-like growth ; leaves somewhat leathery, oval, with their edges quite entire ; bears flowers similar in form to the single ones of the last, but of a beautiful salmon colour. There are one or two varieties of this charming plant, differing in the colour of the flowers. It bears no seed, and is rather difficult of propagation, as cuttings do not strike readily ; it can only be increased by layering.

9. **H Jerroldianus.**—A small, very choice, herbaceous plant ; bears in the hot season very large splendid flowers of a fine carmine-crimson. The stem dies down in October, and the root lies dormant till the approach of the warm weather.

The following varieties have recently been added to an already large list :—

H. albo-variegatus ; **grandiflora variegata** ; and **zebrina** have variegated foliage.

H. schizopetalus, and **H. schizopetalus grandiflorus**, are scandent and semi-climbers in growth, with curious flowers of light scarlet, having the edges of the petals deeply cut and fringed, and turned over backward, like a Fuchsia, with the style projecting out. The flowers are borne drooping, and have a fine effect.

H. brilliantissimus ; **carminatus-perfectus** ; **Colleri** ; **Cocksii** ; **cruentus** ; **Dennisoni** ; **fulgidus** ; **Hawkeri** ; **kermisinus** ; **Lindeni** ; **metallica** ; **puniceus** ; **Patonii** ; **splendens**, and **vivicans**, may be seen growing in most gardens about Calcutta.

On the hills, to grow any of the above satisfactorily, a glazed structure is indispensable.

Malvaviscus.

M. arboreus.—A large, ill-looking, woody shrub, of tree-like growth, with rather small, heart-shaped, three-lobed, coarse leaves, only to be commended for the numerous brilliant, small, crimson-scarlet, half-closed flowers it constantly bears. Should be unsparingly pruned in the cold season. Yields seed abundantly, in small berries, ripening first pure white, and afterwards deep scarlet.

Paritium.

P. tiliaceum.—A small tree with heart-shaped leaves ; bears nearly always large, hibiscus-like, sulphur-coloured flowers, with dark-puce eye. Requires severe pruning. Propagated by cuttings and seed.

Abutilon.

1. **A. Bedfordianum.**—*Jhoomka.*—A tall-growing herbaceous shrub, with rich foliage of luxuriantly-green palmate leaves; bears in the cold season very large, pendulous, eardrop-like flowers, with folded petals of a pale orange colour, prettily pencilled with brown lines. A very choice plant, and one of great beauty when in full blossom; very tender; shelter from the violence of both sun and rain, is indispensable for it. It should be renewed annually, which may be done either from seed or by cuttings.

2. **A. striatum.**–A smaller but more woody kind of plant than the last, and one that will better bear exposure; bears similar flowers, but of about one-third of the size. To secure good plants it is necessary to renew it annually from cuttings.

3. **A. marmoratum.**—Native of Mexico; a small shrub, of recent introduction into India, about four feet high; produces beautiful erect flowers of the size and form of the Canterbury-Bell; rose colour, marbled with pure white veins. It produces abundance of seed, plants raised from which come into blossom in a very short time.

4. **A. marmoratum Sellovianum.**—A recent introduction, and an improved variety of the last-named.

5. **A. Thompsoni.**—Lately introduced; remarkable for its handsome foliage, which is a vivid green blotched with creamy white and yellow. Flowers very similar to the last.

The Catalogues of English Nurserymen contain names of over seventy varieties, nearly all raised by hybridization.

On the hills they must be grown under glazed shelter.

POLYGALACEÆ.

Securidaca.

1. **S. virgata.**—A large, handsome, scandent shrub, with elliptical leaves two inches long; if unsupported, of a very sprawling habit, covering a large space of ground. Blossoms in March with an unlimited profusion of sprays of lively rose-coloured flowers, having much of the appearance of an Indigo. Propagated by layers. 2. **S. Brownei**; 3. **S. scandens**. Plants of these last two are met with in the Calcutta Botanical Gardens. I have not seen them in blossom.

SAPINDACEÆ.

Kölreuteria.

K. paniculata.—Mrs. Loudon describes this as "a middle-sized tree, native of China; very ornamental from its large, variously-divid-

ed foliage, and its conspicuous terminal compound spikes of rich yellow flowers." Dr. Voigt mentions it as existing in the Calcutta Botanical Gardens, but I have been unable to meet with it there.

Dodonæa.

1. **D. dioica.**—An exceedingly pleasing, evergreen, large bushy shrub, with foliage strongly resembling that of the Arbutus. Flowers pale green and insignificant. It thrives well in the North-Western Provinces, where its large expanse of cheerful green foliage is very refreshing to the eye. Propagated by seed, which it bears abundantly. Extensively used for hedges.

2. **D. Burmaniana.**—Presents very little difference to the last, except that its leaves are somewhat larger.

Filicium.

F. decipiens.—Native of Ceylon; a tree of considerable size and of extreme beauty, remarkable for the resemblance its foliage bears to the fronds of a Fern, hence its name; met with at one time only in the Calcutta Botanical Gardens, but now may be seen more commonly about Calcutta. Propagated by seed and cuttings during the rains.

MALPIGHIACEÆ.

Malpighia.

BARBADOES CHERRY.

A genus of very ornamental small shrubs; propagated easily by cuttings. The undermentioned are common in most gardens:—

1. **M. glabra.**—A small shrub with very agreeable foliage of oval, pointed, smooth, shining deep-green leaves, three inches long; bears in May and November, from the axils of its leaves, numerous little umbels of small, pretty pale-purple flowers, with a knob of yellow anthers in the centre.

2. **M. urens.**—A small shrub with dark-green myrtle-like leaves, contrasting beautifully with its small pure white flowers.

3. **M. coccifera.**—A very charming small shrub, with densely-crowded diminutive, holly-like leaves; presents a delightful appearance when covered with its bright, sparkling white buds, just about to open. Flowers, when expanded, pale pink, succeeded by cherry-like berries of the size of a Pea.

All the foregoing are easily propagated by seed and cuttings.

Stigmaphyllon.

S. periplocifolium —A handsome scandent plant, native of tropical America, producing fine yellow flowers. Propagated by layers.

Banisteria.

1. **B. laurifolia.**—An extensively climbing shrub, with lanceolate, dark olive-green rigid leaves, eminently ornamental when in blossom from January to April, and densely covered with large compact trusses of bright golden-yellow flowers. Propagated by layers.
2. **B. argentea.**—Has leaves larger than those of the preceding, very ornamental for the silvery hue of their under surface.

Hiptage.

H. Madablota.—A very large rampant shrub of scandent habit, with lanceolate pointed leaves, seven inches long; handsome when in full blossom with its profuse trusses of white and yellow fragrant flowers, somewhat resembling those of the Horse-chestnut, in the month of February. Propagated by layers.

Camarea.

C. lucida.—A small tree, of coarse woody character; constantly in blossom with numberless beautiful compact clusters of small flowers; those in the upper part of a bright pale-red, and those in the lower part pure white. Propagated by cuttings.

None of the foregoing are suited for the hills.

TERNSTRÖMIACEÆ.

Camellia.

C. Japonica.—Of all the choice plants to be met with in Calcutta, none perhaps is so much coveted and prized as the Camellia; indeed, it is rarely seen except in the collections of those who have the facility of procuring it direct from China. If thought worth the expense and trouble, it might, no doubt, be obtained with ease from Europe; but in this country there appears no prospect of its being brought to exist long in a thriving condition. Three years, it is said, is the longest period that it continues to blossom satisfactorily here; after that it begins to die off, or produce only worthless flowers. It must, however, be remembered that even in England this plant will

not bear exposure to the sun; but to be cultivated successfully, requires to be screened from its rays, by being placed on the north side of a wall, or in some other way. Perhaps to the neglect of this precaution, its want of success in India may be in some measure owing. It blossoms towards the end of the cold season. Requires a light rich soil.

On the hills it comes to perfection, and should be treated in the same way as in England. A green-house is the best place to grow it in.

Thea.

TEA-PLANT.

T. Chinensis.—The three kinds of plant known in Tea-plantations by the names of the China, the Assam, and the Hybrid, though very distinct in habit and peculiarities, are decided to be but the same species. The several sorts of Tea of commerce owe their distinction to the age of the leaf when gathered, and the process of manufacturing it, and may be obtained indifferently from any variety of the plant.

The leaves are elliptical, saw-edged, and of a deep shining green, contrasting well with the flowers, which resemble much those of a Bramble, more interesting from association than from any beauty they possess.

CLUSIACEÆ.

Mesua.

IRON-WOOD TREE.

M. ferrea—*Nâgsura.*—A small tree commonly met with in Assam, and in Lower Bengal, of great beauty, pyramidal in form, with dense foliage of small leathery lancet-shaped leaves, polished on the upper, and hoary white on the under surface, which on first putting forth in March are of a brilliant crimson tinge, and make the tree resemble a flame of fire, particularly when the morning or evening sun is upon it; bears in April, in great profusion large white four-petalled flowers, with large yellow eye formed of its numerous crowded stamens, which scent the air with a delightful fragrance for a wide distance around. Propagated by seed, which must be sown where the tree is to remain, as the young plants do not bear transplanting. Not suited for the Hills.

Calophyllum.

C. inophyllum—*Sultâna Chumpa.*—A tree of considerable size, Native of India, with most noble foliage of large, elliptical, rich,

polished, dark-green leaves; bears in June drooping racemes of large, white, delightfully fragrant flowers; succeeded by numerous large seeds, from which it may be easily propagated.

HYPERICACEÆ.

Hypericum.

ST. JOHN'S WORT.

1. **H. Chinense.**—A small bushy shrub, two feet high, with neat pleasing foliage of narrow elliptical leaves, two inches long, nearly constantly in blossom, with cheerful, bright-yellow, many-stamened flowers; propagated by division.

2. **H. pallens.**—A poor little weedy plant, about a foot high; valueless for the garden. Also is met with 3. **H. patulum,** and **H. elegans.**

NYMPHÆACEÆ.

WATER LILIES.

This and the following Order consist entirely of aquatic plants, some of which are very ornamental in a garden that has water suited to contain them. Most of them may be raised from seed. Sow the seed in a shallow earthen pan, such as a flower-pot feeder, filled with earth; and then place this pan into a somewhat larger and deeper vessel, which must be carefully filled, and afterwards kept constantly supplied with water. When the seeds have germinated, remove the small pan of earth containing them from the larger vessel, and cautiously lower it, just as it is, in the piece of water where the plant is desired to grow.

Some of the small species may be grown in large earthen vessels sunk to the rim in the earth, and kept filled with water. These when properly attended to have a very pleasing and refreshing appearance, especially if in some situation near the entrance to the house, surrounded by potted plants of different kinds.

Euryale.

Eu. ferox.—A small plant; native of India; remarkable principally for its curious bristling foliage; flowers small, blue, and of no interest whatever; well adapted for growing in an earthen vessel, as above described.

Victoria.

V. regia.—This noble aquatic, native of South America, thrives well in the tanks about Calcutta, and produces its magnificent blossoms principally in the cold season. The flower is of immense size, as much sometimes as a foot in diameter, white tinted with rose-colour, and passes through three distinct stages in the process of expanding, with the interval of a day between each stage, and is almost equally beautiful during each of these stages. When perfectly expanded, it almost immediately dies off. By some the leaf will be considered an object of even as much interest as the flower. In its upper surface it resembles a large round tea-tray, three or four feet in diameter, laid upon the water; and in its lower surface it presents a most curious and complicated network of fibres, from which project a very formidable array of thorns. The plant is found not to exist more than two years, when its place must be supplied by a fresh one raised from seed, which in the vicinity of Calcutta it bears abundantly. If the seeds have to be conveyed to a long distance, it has been found that they will only retain their vitality by being kept in phials of pure water. All attempts at introducing the plants into this country failed till Dr. Wallich resorted to this plan. The seeds are sometimes very long in germinating. Mr. M'Murray states :—

"Two of the Victoria regia seed, presented to the Society by the late Dr. Wallich on the 8th November 1851, have germinated during this month, after lying in the gumlah of mud and water for two years and nine months." *

A very full description of this plant, with fine illustrations, is to be found in the first volume of the 'Gardener's Magazine of Botany.'

Nymphæa.

1. **N cærulea.**—Native of Egypt: a small and most desirable plant; admirably adapted for growing in some conspicuous place in a large earthen vessel sunk to the rim in the ground. Its beautiful many-petalled flowers are of the size of a Tulip, blue, with a yellow centre, and emit a most delightful fragrance, like that of orris-root. Bears seed abundantly.

2. **N. stellata.**—Native of the jheels of Bengal, where, when in blossom and seen at a little distance, it might be taken for the last; but the flowers are not so double, and have no scent.

3. N. **pubescens** and **N. edulis.**—Are white Water-lilies, common in waste pieces of water about Bengal; but have no pretensions to the beauty of N. alba so common in England.

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* 'Journal of the Agri-Horticultural Society,' vol. ix, p. 49.

4. N. **rubra**.—Native of Bengal; very handsome when in blossom with its large and brilliant red flowers.

5. N. **versicolor**.—Native of Bengal; bears large rose-coloured flowers.

NELUMBIACEÆ.

Nelumbium.

1. N. **speciosum**—THE SACRED LOTUS—WATER-BEAN.—*Puddum—Kunwul.*—A large and, when in blossom, very beautiful plant, common in tanks and jheels in every part of India. Bears in the hot season very large, double, rose-coloured handsome flowers. It produces seed abundantly in curious, drooping, cone-shaped seed-vessels. The seeds are sown by enclosing them in a ball of clay, and throwing them into the water.

2. N. **luteum**.—THE YELLOW WATER-BEAN.—Native of Carolina: There used to be a small plant in the gardens of the Agri-Horticultural Society, but I am not informed whether it has ever flowered or not.

MAGNOLIACEÆ.

Talauma.

T. **pumila**.—A very delightful shrub, about five feet high, native of China, and not uncommon in the Calcutta gardens; would be very handsome if the foliage only remained in a healthy condition, but owing to some unexplained cause, has nearly always a shabby appearance from a great part of each leaf becoming decayed. This I thought might possibly arise from its being usually planted in a situation too exposed to the sun, but I noticed plants in the conservatory at Kew in the same condition. Bears at nearly all seasons, but principally in the cold weather, pure-white globular flowers of the size of a Tulip, opening in the evening and falling off the next morning. A single flower will perfume the garden for a great distance around with its quince-like fragrance: propagated by layers, and by cuttings in sand, put down in the rains.

Magnolia.

1. M. **grandiflora**.—A small tree, fifteen feet or more in height, native of Carolina; noted for the beauty of its noble laurel-like foliage; considered one of the choicest plants in Calcutta, where it thrives with difficulty, and only as a shrub of moderate size. Bears in April its

grand white fragrant flowers, and in August occasionally ripens seeds, which are of the size of a Tamarind-stone, and of a brilliant red. Propagated by gootee, but with extreme difficulty.

2. **M. fuscata.**—A small ramous shrub, two or three feet high; native of China; with exceedingly neat foliage, somewhat resembling that of a Camellia: bears in March small pale-yellow or cream-coloured flowers of a deep dull crimson within, of the size and something of the form of a pigeon's egg, exquisitely fragrant, especially after rain.

3. **M. pterocarpa.**—A large handsome tree, native of India, with large noble leaves; bears in April in unbounded profusion its large, pure-white globular-formed, finely-fragrant flowers. The last two propagated by layers and cuttings.

The following varieties are also to be met with in Calcutta:—**M. anonafoli**; **conspicua**; **matubilis**; **pumila**; **Soulangena nigra** and **purpurea**, all recent introductions.

Michelia.

M. Champaca.—*Chumpa.*—A small tree, about twenty feet high, very common in Bengal, with very fine foliage; bears, principally at the beginning and end of the cold weather, numerous large narrow-petalled flowers of a dull, lifeless, lemon-colour, emitting for a wide distance around a most delicious fragrance.

After flowering, the tree often becomes so exhausted by the prodigious quantity of large yellow berries it ripens, as hardly to recover itself and produce a flower for a year or more afterwards. This, no doubt, might be obviated by timely removal of the berries as they set. Propagated by seed.

ANONACEÆ.

Artabotrys.

A. odoratissimus.—A large shrub, native of this country, of scandent tendency, with dense foliage of handsome, lanceolate, glossy, pure-green leaves; bears, principally in the rains, moderate-sized, irregular-formed flowers, very similar to those of the Custard-apple, of a heavy, pale yellow colour, generally hidden out of sight under the leaves, whence they emit agreeable gusts of perfume, somewhat like that of over-ripe Apples: very ornamental when covered with its small, golden, pear-like fruit. Propagated by seed and cuttings during the rains.

DILLENIACEÆ.

Dillenia.

D. speciosa.—*Chulta.*—A large and very common tree of this country, remarkably handsome for its foliage of noble, pointed, elliptical leaves; bears in July, very large, pure-white, fragrant flowers. with yellow anthers: very ornamental likewise in the cold weather, when bearing in abundance its large, round, green fruits, of the size nearly of a child's head. Propagated by seed during the rains.

Delima.

D. sarmentosa.—A scandent coarse-looking shrub, with leaves like those of the last; bears loose panicles of small, yellow, very fragrant flowers. Propagated by cuttings in the rains.

RANUNCULACEÆ.

Clematis.

VIRGIN'S BOWER.

Several species of this extensive genus of beautiful-flowered climbing plants have been introduced; but have for the most part evinced a great reluctance to blossom. They thrive remarkably well on the hills. Besides 1. **C. brachiata**; the native 2. **C. Gouriana**; and the Spanish 3. **C. Viticella**, there are met with the following:—

4. **C. Cadmia.**—A new and very beautiful plant, producing in the cold season large star-formed flowers of five pure-violet petals; with dense and very pretty foliage of small ternate leaves. It requires shade, and dies down in the rains.

5. **C. Flammula.**—The common European species, so well known for the exquisite fragrance of its blossoms, which, during the rains, it puts forth in clusters of small white flowers from its dense small-leaved ternate foliage.

The Clemates is now grown in England as a Florist's flower, and many varieties of great beauty have been raised by hybridization, especially by Messrs. Jackman, who have made these plants their speciality. The following are offered by one of the large Nurserymen in Calcutta: —**Gipsy Queen**; **Gloire de St. Julien**; **Henryi**; **Lawsoniana**; **Marie Lefebvre**; **Mr. George Jackman**; **Mrs. Hope**; **Otto Frœbel**; **Purpurea Elegans**; **Prince of Wales**; **Star of India**; **William Kenell.**

All the varieties grow well in our grass conservatories, and love a light rich soil, principally of leaf mould and sand. They are propagated by layers put down in the rains.

Anemone.

1. **A. coronaria.**—The Florist's Anemone, a small tuberous plant, producing flowers of extraordinary beauty, single and double, in almost endless variety. The tubers must be imported each season from England in time for planting in October. They blossom about March. Their cultivation in Calcutta is attended with little success, and even as high up as Allahabad Mr. S. Jennings informed me his attempt to grow them proved a failure. They succeed well generally in the North-West Provinces. When at Ferozepore I imported tubers, which blossomed well without much care bestowed upon them. While there I also raised plants from seed; the seed, being of a woolly nature, is easily transmitted in a letter. I took up the young tubers on the approach of the hot weather, and kept them in the house till the following cold season, and then planted them in pots, where they blossomed very freely and beautifully. But I found that both imported and seedling tubers became worn out and worthless after once blossoming.

They require a light soil of common mould and decayed vegetable matter, or very old, rotted cow-manure and river sand. The tubers should be planted about two inches deep in a hole into which a pinch of sand has been dropped. On the hills, where they thrive to perfection, the tubers should be put down in February and March.

2. **A. Japonica.**—A native of China, from whence it was sent here some years ago by Mr. Fortune, but, though thriving well, has never blossomed. The flowers, two inches across, pale pink, are very beautiful, and in England during the autumn are quite an ornament to the garden. There is a white variety, and one of great beauty named Honorine Jobert. Though a native of damp woods, on the edges of rivulets, it thrives well in common garden soil.

Hepatica.

This pretty little flowering plant, so common in English gardens, is unknown in India.

Ranunculus.

R. Asiaticus.—The florist's Ranunculus, with its numberless lovely varieties, including those of the sorts called Persian, Scotch, and Turban, is cultivated in this country exactly in the same way as the Anemone.

Aquilegia.

A. vulgaris.—COLUMBINE.—This pretty and familiar plant may be raised from seed in October, and preserved through the hot and rain seasons till the following cold weather, when, though thriving vigorously, it is seldom, if ever, disposed to blossom, at least in the locality of Calcutta. It blooms very freely in Upper India; while on the hills several varieties are found growing in wild profusion during the rains.

Pæonia.

PÆONY.

A genus of plants celebrated for their great splendid flowers. Pæonies have several times been introduced into this country, but their cultivation has been attended with no success whatever, as they are unable to bear the heat of the climate. Even in the more congenial locality, as it might be thought, of Ootacamund, the attempt to cultivate them has uniformly proved a failure. On the hill stations of the Himalayas they grow to great perfection, and should be treated as in England.

FUMARIACEÆ.

Dielytra.

D. spectabilis.—This beautiful herbaceous shrub, remarkable for its curious pendulous locket-shaped flowers, was sent in 1856 by Mr. Fortune from China to this country, but was found unable to exist in the climate.

BERBERIDACEÆ.

Nandina.

N. domestica.—SACRED BAMBOO OF CHINA.—A very handsome shrub, from five to six feet high, with light and airy bipinate foliage of small, narrow, myrtle-like leaflets. Mr. Fortune says that—

"In China, in the month of January, large quantities of its branches are hawked about the streets; each of the branches is covered with a large bunch of red berries, not very unlike those of the common Holly, and when contrasted with the dark shining leaves are singularly ornamental."*

* 'Tea Districts,' p. 122.

Large plants have been for many years in the Calcutta Botanical Gardens, and thrive well there, but rarely blossom. The plant is not often met with in Upper India. The flowers, borne in panicles, are of a dull white colour, with yellow anthers, and of little interest. Propagated by division.

Berberis.

BERBERRY.

A rather numerous genus, several species of which are regarded as highly ornamental in English gardens. The four or five that can grow in the plains of India are not objects of much beauty.

1. **B. Asiatica.**—A middle-sized shrub, with thorny stems and leaves, in general aspect of a pale ashy green. Loudon describes it thus:—"The flowers are yellow and beautiful, berries purplish with a fine bloom, and decaying leaves yellow and red."

2. **B. arisiata,** *var.* **floribunda.**—Very similar in general appearance to the last.

3. **Fortuniana.**—A deep-green smooth bush, native of China, introduced by Mr. Fortune. Leaves pinnate, with three to four pairs of leaflets and an old terminal one. Bears pretty racemes of small, bright-yellow flowers in the rains, agreeably relieved by the dark-green foliage of narrow, lanceolate, saw-edged leaflets. No doubt an exceedingly beautiful plant grown in a climate that suits it.

4. **B. Leschenaultii,** *syn.* **Mahonia pinnata**—HOLLY-LEAVED BERBERRY.—Native of the Nilgherries, mentioned by Dr. Voigt as blossoming here in January. I have never met with it. A light soil suits them. Propagated by cuttings and seed.

VITACEÆ.

Cissus.

1. **C. discolor.**—A very choice, slender, creeping plant, with foliage, when in a thriving condition, of exquisite beauty. Leaves lanceolate, cordate, about five inches long, mottled with red, white, and dark green, with the richest velvet-like lustre, borne upon delicate, pale-red stems. Produces in the cold season pale, minute, insignificant flowers. Requires a light, porous soil, through which water will drain away freely, and absolute exclusion from the sun. A humid atmosphere and a dark situation are most congenial to it. Propagated

by cuttings in sand under a bell-glass, but more easily by layers during the rains.

C. Amazonica, is very similar to the last, only not so lovely. **C. Kunsterlii, Lindenii, Mariesii and porphyrophylla**, are recent introductions, and bear a strong general resemblance to the first named, differing from it very slightly in the coloration of the leaves. All of them thrive to perfection in the grass conservatory. On the hills they must be grown in a stove.

Leea.

L. sanguinea.—A very large, herbaceous plant, with pinnate foliage of large, long, lanceolate leaflets; of rather weedy character, but handsome during the rains for the mingled bright crimson red flowers and berries it bears in large flat cymes, of the size of a man's expanded hand, much like those of Clerodendron squamatum. Propagated by layers and cuttings during the rains.

PITTOSPORACEÆ.

Pittosporum.

1. **P. Tobira.**—A large, bushy, very handsome shrub, four feet high; native of China; with leaves two or three inches long, of obovate form, smooth-edged, coriaceous, of a cheerful, shining green. Its merit as an ornamental plant consists entirely in its neat dense foliage; for though Mrs. Loudon says that in England "it bears large terminal clusters of white, very fragrant flowers nearly all the summer," it seldom, if ever, blossoms here.

P. Tobira variegatum.—A pleasing variety of the above, having its leaves variegated with white.

2. **P. verticillatum.**—A shrub bearing in most respects a strong resemblance to the last; bears in the cold season terminal clusters of white flowers, perfectly inodorous, very small, and not very interesting. All of the above are propagated by cuttings in February.

Sellya.

S. heterophylla.—A slender climbing plant; bears small cymes of five-lobed flowers, not large, but of a beautiful azure blue. Dr. Voigt mentions it as growing here and blossoming in December. I have never met with it, nor heard of its being here now.

EPACRIDACEÆ.

Epacris.

A genus of plants much cultivated in England for their very beautiful flowers, in general character somewhat resembling Heaths. Altogether unknown, I believe, in India.

ERICACEÆ.

Erica.

HEATH.

A most extensive genus of plants, nearly all natives of the Cape of Good Hope, and, except in the solitary instances recorded below, altogether unknown in this country.

E. speciosa.—Of this Mr. M'Murray, some time Gardener of the Agri-Horticultural Society, exhibited in February 1854, a specimen, with the following remarks :—

"The accompanying plant of Cape Heath in flower is the produce of one kind of the seed sown in October 1852, from which it will be seen that the plant has made a good growth since that time, and is probably the first plant of the sort which has flowered in Bengal. In addition to this variety of Heath, there are in the garden ten other kinds raised from the same batch of seed, equally as healthy, but not so large."*

How long these plants survived I am not aware. They were not in existence two years afterwards.

Arbutus.

STRAWBERRY-TREE.

Altogether unknown in India.

Azalea.

Plants of Azalea, received but a short time previous, sent by Mr. Fortune from China, were exhibited in bloom at one of the Calcutta Horticultural Shows; but no plant of this genus can survive the heat of an Indian climate. They thrive to perfection on the hills, where they are almost hardy.

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* 'Journal of Agri-Hort. Soc.,' vol. ix, p. 10.

Kalmia.

Quite unknown in this country.

Rhododendron.

No species of this genus of superbly-flowering trees can exist in the plains. Several species are indigenous on the hills.

AURANTIACEÆ.

Murraya.

1. **M. exotica.**—CHINA BOX—*Kâminee.*—A large, common, and very handsome bushy shrub, about nine feet high, in general aspect much resembling a Box-tree, with neat, shining, dark-green foliage of pinnate leaves; leaflets six or eight, an inch or two long, alternate, rigid, and quite smooth; bears several times during the hot and rain seasons, at uncertain periods, in vast profusion, corymbs of orange-blossom-like white flowers, which, for the day or so that they last, scent the air all round with a delicious honey-like fragrance; bears in the cold season numerous small red berries, not unlike those of the Holly. Propagated by cuttings during the rains.

2. **M. Sumatrana.**—Similar to the last, but the leaflets somewhat larger. Flowers largish, white, sweet-scented; borne one on a footstalk.

Clausena.

C. heptaphylla.—*Pân-Kapoor—Karan-Phool.*—A small shrub three feet high, native of this country, with smooth oval leaves two or three inches long, which when rubbed or bruised emit a most agreeable fragrance, like that of anise-seed; bears in March insignificant greenish-yellow flowers, succeeded by little green berries. Propagated by cuttings during the rains.

Micromelum.

M. integerrimum.—A small shrub with large leaves; bears in March very small, greenish-white, exceedingly fragrant flowers, and afterwards bunches of little bright orange-coloured berries, which when bruised emit an overpowering fragrance. Propagated by cuttings put down in October.

Luvunga.

L. scandens.—A climbing shrub, native of Sylhet, with lanceolate pointed leaves six inches long; described as bearing corymbs of middle-sized, delightfully-fragrant white flowers. Propagated by layers during the rains.

Citrus.

A genus of fruit-trees described elsewhere; all, without exception, most delightful ornaments to the garden, alike for their foliage, their flowers, and their fruits.

CEDRELACEÆ.

Swietenia.

S. Mahagoni.—MAHOGANY-TREE.—An immense timber-tree with beautiful foliage of moderate-sized, ovate, rich-green leaves. Dwarf shrubby plants may be obtained by propagating from cuttings, which have a very ornamental appearance in any spot where a mass of refreshing green foliage is required. The large full-grown trees sometimes met with about Calcutta produce seed, from which young plants may be raised.

MELIACEÆ.

Munronia.

M. Javanica.—A small shrub introduced by Mr. Grote. Produces in the rains deliciously-scented white flowers. Propagated by cuttings during the rains.

Melia.

M. sempervirens.—*Bukâyun.*—A small, and though exceedingly common, when in a thriving condition, a remarkably handsome tree, especially when in blossom, with its numerous small, fragrant, lilac-coloured flowers. Foliage very similar to that of the Ash. Propagated by seed during the rains.

Aglaia.

A. odorata.—An exceedingly handsome bushy shrub, native of China, three or four feet high, with neat ternate leaves of lanceolate, smooth deep-green, shining leaflets, two or three inches long. Blossoms at uncertain times in the hot and rain seasons, with a prodigious number of bright-yellow flowers, of the size and form of a pin's

head, delightfully fragrant. Mr. Fortune says the flowers are much used by the Chinese for scenting their teas. Don states that the berries it bears are eatable when ripe; but it is never known to bear any here. Propagated by cuttings during the rains.

RUTACEÆ.

Erythrochiton.

E. Braziliensis.—A small tree, described as having "foliage fragrant with the scent of Oranges, and bearing large white flowers with fine red calyxes." Apparently unsuited to this climate, as the specimens in the Calcutta Botanical Gardens do not show that the climate of this country is congenial to them.

Lemonia.

L. spectabilis.—A most charming shrub, native of Cuba, with ternate leaves of equal sized, obovate, smooth, rich polished-green leaflets, about two inches long, contrasting handsomely with the cork-like bark of the stems, and which, when bruised, have an agreeable fragrance like that of Fraxinella; nearly always in blossom with bright, crimson-pink, five-lobed flowers, of the size of a four-anna piece; requires shade and moisture to give the foliage the rich deep verdant green which renders this plant so beautiful. Produces seed abundantly in the cold season, which, before ripening, should be tied up in muslin, or is sure to fall and be lost. Propagated also by cuttings.

There is a variety with pale-pink flowers, but not so handsome.

Boronia—Crowea—Correa—Calodendron—Diosma—Barosma—Agathosma.

The numerous species of these several genera, the three first natives of New Holland and the remainder of the Cape, are for the most part very ornamental shrubs, producing beautiful flowers, and much cultivated in green-houses in Europe, but not a single one is to be met with in this country, nor is it at all probable would be able to exist in the climate.

Dictamus.

D. Fraxinella.—This old familiar, fragrant-leaved plant of the English gardens is altogether unknown here.

Ruta.

1. **R. angustifolia**—RUE.—The prettily-formed hoary-green foliage of this small well-known herb forms a pleasing variety amongst other pot-plants; bears in the cold season greenish-yellow uninteresting flowers. Propagated by division.

2. **R. graveolens.**—The Common Rue of the English gardens, between which and the last the difference is not very perceptible, is, I believe, not met with here.

SIMABURACEÆ.

Quassia.

Q. amara.—A tree in Surinam, its native locality, of considerable size; grows here to not more than about seven feet high, and is regarded as one of the choicest, as it certainly is one of the most beautiful, plants of our Indian gardens; leaves unequally pinnate; leaflets obovate, four inches long more or less; leafstalks with wide, crimson-tinged wings; bears in April and May terminal racemes of Erythrina-like bright crimson-scarlet flowers. Propagated by gootee, as well as by cuttings, under a hand-glass in sand.

ZYGOPHYLLACEÆ.

Tribulus.

1. **T. lanuginosus.**—A low trailing plant with pinnate leaves; bears nearly always large bright-yellow sweet scented flowers.

2. **T. cistoides.**—A trailing herbaceous plant with pleasing dark-green foliage of pinnate leaves; bears throughout the year large pale-yellow flowers, much like widely-expanded Buttercups. Propagated by layers and cuttings.

LINACEÆ.

Linum (now called Reinwardtia.)

1. **L. trigynum**—*Busuntee—Gool-i-ushrufee.*—A small herbaceous shrub two feet high, common in most gardens where, when in blossom in the cold season, it is a most showy ornament, with its unbounded profusion of large, orange-yellow, rock-rose-like flowers. Propagated by division of roots in October.

2. **L. tetragynum.**—A plant of the same size as the last, with much larger leaves; equally showy with its large pale, sulphur-coloured flowers.

OXALIDACEÆ.

Oxalis.

A genus of very beautiful small bulbous plants, affording during the cold months, while they are in blossom, a most delightful decoration to any verandah somewhat exposed to the sun. They begin to die down at the beginning of May, and should then be no longer watered. When dry the bulbs may be either removed from the earth, and stored away in a bottle of dry sand, or be put aside just as they are, undisturbed in their pots in some place out of the wet till October, when they begin to start again. But a little before that time they must be carefully watched, in order to pot them immediately and expose them to the light when they show signs of starting, or they will in a very short time exhaust themselves by throwing out long white shoots, and then perish.

Mackintosh says :—

"They should be taken out of the mould every season for the purpose of being separated; for if the smaller roots be not removed from the full-grown ones, the latter will not flower freely. They delight in a light rich soil."*

The soil, however, may easily be rendered too rich, and then, as I have found, the leaves become yellow and sickly. A compost of leaf-mould, common mould, and a little silver-sand, suits them best.

The undermentioned are those usually met with in the Calcutta gardens. Mr. J. Scott, in a paper communicated to the Agri-Horticultural Society, describes fourteen species, besides those cultivated in the Botanical Gardens; but full ten times that number are set down in Paxton's Dictionary as introduced into Britain, most of which might, no doubt, if worth it, be cultivated here equally well as those we already have.

1. **O. Bowei.**—A rather common species, and a remarkably beautiful one, most so perhaps of any, with large handsome leaves, the agreeable fresh greenness of which affords a fine set-off to the large deep-rose-coloured flowers, of the size of a rupee, that are borne numerously in heads upon footstalks six inches high throughout the cold season.

2. **O. rosacea.**—Somewhat similar to the last, the flowers being deeper in colour with large yellow centre, borne upon short footstalks

* 'Greenhouse,' p. 150.

close to the ground among the leaves. A perfect little gem when thriving and in full blossom.

3. **O. versicolor.**—Bears crimson flowers; very inferior to either of the two preceding.

4. **O. variabilis.**—Bears small dull-crimson flowers.

5. **O. Deippei.**—Bears small pale pink flowers; a common, uninteresting plant; grows like a weed nearly everywhere.

6. **O. tetraphylla.**—A common and very pretty plant; unlike the rest of the species, it has leaves with four lobes instead of three, and bears its purplish-pink flowers during the hot and rain seasons, and not in the cold months.

7. **O. lanata.**—A pretty plant, with leaves of a peculiar pale bluish-green colour; flowers white, not showy, nor opening very freely.

8. **O. bipunctata.**—A pretty unpretending plant, with small leaves, and umbels of small white flowers upon long footstalks.

9. **O. cuprea.**—A charming plant with glaucous green leaves; bears in profusion, upon long footstalks, umbels of flowers like golden-yellow primroses.

10. **O. cernua.**—Has its leaves curiously speckled with black spots; presents a very brilliant appearance when bearing its profusion of bright-yellow flowers, somewhat smaller than those of the last.

GERANIACEÆ.

Pelargonium.

GERANIUM.

THIS favourite plant, known to all under the common name of Geranium, and comprising some hundreds of varieties, is a native of the Cape of Good Hope; but is almost naturalized in this country; while in England and on the Continent it has been brought to such perfection by cross-breeding as to be now classed as a Florist's flower.

It was not so very long ago that the Pelargonium was represented out here by a few common-place scarlet varieties only; during the last ten or fifteen years, however, hundreds of varieties have been imported from Europe, and have been found to succeed very well with a little careful management. On the hill stations Pelargoniums thrive and bloom to such perfection that lovers of this flower on the plains now make it a point of obtaining their supplies of plants from thence every year to replenish their exhausted stock, instead of importing them from Europe. This is certainly the best plan, as amateurs and others on the hills import all the newest and best varieties from Europe, and are able

to raise a large stock of plants in one year; for Pelargoniums make most vigorous growth on the hills, and are so easily propagated by cuttings put down at any time during the year.

The best plan for those on the plains is to obtain a large number of cuttings in the month of October from the hills. On receipt, put them down at once in sand with some bottom heat. They will strike in two or three weeks, when they should be potted off singly into two-inch pots, shifting them into larger ones as they progress. They should get their final shift into six-inch pots about the end of December, the soil chosen being light and rich. They should be liberally watered, with occasional—say weekly—applications of liquid manure. The leaves should be frequently washed or syringed with soap-suds, by which they are much benefited. They will then bloom to perfection from about the middle of January to the end of March, or later in Upper India.

It is difficult to keep the plants alive through the hot and rainy seasons, especially the latter. During the hot months they require to be entirely sheltered from the fierce rays of the sun; but in a grass-conservatory they do very well. In the rainy season, they must be absolutely protected from the wet, if in pots, while getting as much light as possible; otherwise they will rot and die off.

Propagation by cuttings is the easiest and safest method of increasing the stock of plants; but they can also be raised from seed, which should be sown in October. In the latter case the plants will not bloom till the following cold season, if they can be made to live till then. About the middle of October the plants saved should be well cut back and re-potted in fresh soil; the branches cut off being utilized for cuttings.

On the hills the pruning and re-potting should be done about the middle of February or, if the season is a late one, about the beginning of March. When they are done flowering, *i.e.*, about the third week in November, the pots should be plunged in the soil under protection of glazed frames, or in a greenhouse, where they should remain until the time comes round for repotting and pruning. They require very little water during the winter months—only just sufficient to keep them alive.

There are several classes of Pelargoniums, *viz.*, (1) the ordinary scarlet flowered; (2) the Zonal, or Horse-shoe, known also as Bronze, Silver, and Gold-leaf tri-colours; of these there are hundreds of varieties, both single and double flowered. Then there are (3) the Ivy-leaved varieties, which are mostly climbers; (4) the Lemon and Rose-scented, remarkable for the delicious fragrance of their leaves; and lastly the Fancy, or large-flowered, also known as "Oak-leaved." These last named do not succeed well on the plains, and might be left out as a rule; although they are by far the most beautiful of the flowering

varieties. It would be tedious to give a list of the names. A catalogue of any of the English nurserymen will supply this information, from which a selection might be made. This will, however, be found unnecessary if cuttings or plants are obtained from the hills. The selection might with advantage be left to the person from whom they are obtained; or he might be asked to supply a list of the named varieties in his possession, and by comparing these with the descriptive lists given in the English nurserymen's catalogues, a very good selection can be made.

CARYOPHYLLACEÆ.

Dianthus.

1. **D. Chinensis.**—CHINA PINK.—This plant, though perennial, is always in this country treated as an annual.

2. **D. laciniatus.**—A variety of the last, lately introduced from Japan; bears very large, beautiful flowers of various colours, single and double, quite scentless. The seeds should be sown in October on the plains, and in March on the hills, and the young plants potted off singly into pots with well-drained soil, and kept under shelter during the rains, afforded at the same time as much light as possible. Repotted in the following October, or planted out in a soil well enriched with leaf-mould in the open border, they will blossom in great splendour during the cold weather; during which time also they may be easily propagated by layers. They blossom, too, in pots more or less all the rest of the year, but they require to be continually renewed.

3. **D. Heddewigi.**—Also lately introduced from Japan; bears large, superb, crimson flowers, with petals prettily fringed. Cultivated in exactly the same manner as the last. This likewise is considered a variety of D. Chinensis.

4. **D. barbatus.**—SWEET WILLIAM.—The fine varieties of this plant, though they thrive well, rarely if ever open their beautiful trusses of bloom in the locality of Calcutta. The seed may be sown in October on the plains, and in March on the hills, and the young plants kept through the succeeding hot and rainy seasons, by sheltering them from the wet, without at the same time screening them too much from the light. In November, pot them singly in large pots with fresh and rather rich soil. During the dry weather they will be benefited by having their pots sunk in water to the rim for an hour or two every four or five days.

5. **D. Caryophyllus,**—Comprises those lovely and varied fragrant flowers so well known under the name of Carnation Clove and Picotee.

In the locality of Calcutta the only specimen ever met with is a dull, dark-crimson flower of poor description. Plants of choice kinds may be raised from seed, and preserved easily from year to year, but they obstinately refuse to blossom.

In the North-Western Provinces, on the other hand, no plants succeed more satisfactorily. Seed of the finest kinds is expensive, but it rarely fails of germinating abundantly, and well repays for the cost of it. It should be sown in October. The young plants should be put out about March, in a prepared piece of ground, elevated enough that no water may lodge upon it, and it will be found that they can then bear, without taking much harm, full exposure to both sun and rain. Should, however, a little protection be considered expedient, it is of the utmost importance that they be not overscreened from light, or they will be all but sure to perish. In October or November each plant may be put in a large-sized pot, with a soil composed of equal parts of common earth, vegetable-mould, decayed cow-manure, and a little sand. From the cow-manure the large white grubs must have been carefully picked out. By the above mode of cultivation at Ferozepore, I had a large collection of plants, giving in the month of March a splendid display of beautiful flowers of nearly every variety.

They are easily propagated by pegging down the longer stems in their pots; if this be done in November they very soon make roots, and form fresh plants. Or sink a flower-pot in the ground in a shady place, half-fill it with river-sand; insert cuttings, well water them, and cover the pot with a pane of glass. Adopting this latter method, I have met with much success in increasing my plants. On the hills all the foregoing can be cultivated as perennials, as they usually are, and increased by cuttings.

Saponaria.

S. officinalis.—A pretty herbaceous plant, about fifteen inches high; most commonly in blossom; bears pale-pink flowers, somewhat resembling, but much inferior to those of the Phlox. Propagated easily by division of the roots. Can also be raised by seed sown in October on the plains, and in March on the hills.

PORTULACACEÆ.

Portulaca.

P. meridiana.—A small pot-plant ornamental for its pretty moss like leafage. Raised from seed in February.

Portulacaria.

P. Afra.—SPECKBOOM—ELEPHANT'S FOOD.—A pretty little pot plant, with small, succulent leaves; native of a lofty mountain near Cradock at the Cape, called after it the Speckboom Mountain; though thriving well, never known to blossom here, I believe.

POLYGONACEÆ.

Polygonum.

P. adenophyllum.—A large herbaceous plant, native of the Mysore hills; bears, during all the cold season, numerous dense spikes of small pure-white flowers; exceedingly bright and cheerful, especially as the hot weather approaches, when the foliage assumes an autumn-red tinge; grown in the border it is rather troublesome, as it spreads over the ground very rapidly. Propagated by division and cuttings.

Coccoloba.

C. macrophylla.—Is described by Curtis as—

"A noble, simple-stemmed, erect tree, with large leathery leaves, a foot or more long; tapers gracefully upward, is leafy all the way up, and terminates at the top by a dense compact thick club-shaped raceme of flowers, of which the rachis, pedicles, and flowers are of the richest scarlet." *

A few plants are to be met with in the Calcutta Botanical Gardens.

Antigonon.

A. leptopus—*Sandwich-Island Climber.*—A lovely plant, of late introduction; much of the character and habit of **Poivrea coccinea,** and in blossom throughout the rains and cold season. Propagated by seed or cuttings during the rains.

A. Insigne.—A recent introduction; very similar to the last, except that it bears lighter coloured flowers, and is of less extensive growth.

NYCTAGINACEÆ.

Bugainvillea.

1. B. spectabilis.—A large, exceedingly rampant, thorny, extensively-climbing shrub; requires, if not trained up a tree, some powerful

* 'Botanical Magazine,' 1. 4536.

bamboo framework for its support; except when in blossom, not at all ornamental; bears in February and March small tubular, pale-yellow flowers, enveloped by two largish, bright, pale crimson, bracteal leaves, in such unlimited profusion as to present one perfect blaze of colour, and at that time an object of wonderful splendour; usually propagated by layers, but may be also by cuttings of the ripened wood.

2. **B. glabra.**—A thornless variety of the above, with smooth shining leaves. Produces flowers similar to the last, but the bracteal leaves are of a brilliant mauve colour. A lovely object when in full bloom, which it continually is in, throughout the year.

3. **B. speciosa.**—Very similar to the first named, there being a slight difference in the colour of the bracteal leaves.

4. **B. lateritia,** and 5, **B. splendens,** are recent introductions, and promise to become real acquisitions to our gardens. They do not differ much from **B. glabra.**

Pisonia.

P. morindifolia.—LETTUCE-TREE.—A very large ramous shrub, six or seven feet high, with dense foliage of large, lanceolate, pale lettuce-green leaves, which alone constitute its ornamental character. The climate of Calcutta seems too cold for it to acquire the verdant condition essential to its beauty. About Bombay it is often grown in large tubs, kept during the cold months under the shelter of the verandah, where it has a very refreshing and agreeable appearance. Propagated by seed or cuttings.

Mirabilis.

1. **M. Jalapa.**—MARVEL OF PERU—*Gool-i-ubbâs.*—A large and very common herbaceous plant, found in gardens in all parts of India; constantly in blossom with numerous Ipomœa-like flowers of moderate size, some dark crimson, some pure yellow, some crimson striped with yellow; flowers of each variety frequently upon the same plant; produces seed abundantly, from which it commonly springs up self-sown.

2. **M. longiflora.**—SWEET-SCENTED MARVEL OF PERU.—Described as bearing white flowers with a tube four or five inches long, and emitting a powerful odour like that of Orange-flowers and Heliotrope combined. Dr. Voigt states that it was in the Calcutta Botanical Gardens seven years without blossoming.

AMARANTHACEÆ.

Achyranthes.

A. alopecuroides.—A small herbaceous plant, ornamental for the foxtail-like heads of small milk-white flowers it bears, which give a very pretty effect when mingled with others in a bouquet; raised from seed in October.

Ærua.

Æ. sanguinolenta.—A small herbaceous plant, with leaves and stems of a dull-red colour; a weedy, by no means attractive object.

Iresine.

1. **I. Herbstii.**—With small dark crimson leaves; and 2. **I, aureo-reticulata,** plants of little interest except for edgings to flower-beds. **Alternanthera amabilis,** and **A paronychyoides** are of recent introduction, and are extensively used for edgings to beds and borders, where they appear to great advantage. Being of very dwarf growth, they are admirably suited for this purpose, especially on account of the bright colouring of their leaves. Easily propagated by cuttings during the rains.

MESEMBRYACEÆ.

Mesembryanthemum.

FIG-MARYGOLD.

The species of Fig-Marygold are rather numerous; principally natives of the Cape, and, like most Cape plants, unsuited to the climate of India.

M. cordifolium.—The only perennial species I know of established here; a small succulent pot-plant, bearing at nearly all times of the year bright-purple flowers of the form and size of a Daisy, which open only in the sunshine. Propagated by seed in October on the plains, and in March on the hills.

THYMELACEÆ.

Daphne.

1. **D. Fortuniana.**—A small ornamental shrub, native of China, with very neat pretty foliage; bears, at the beginning and end of the cold season, handsome umbels of dark-lilac salver-shaped

flowers more than an inch long. A single plant was for some years in the gardens of the Agri-Horticultural Society, introduced originally by Mr. Fortune. But this subsequently died, and I know not if the plant is to be met with in this country now. In China, it is said, to blossom in a leafless state. Here it does not lose its leaves, and seems to bear the climate very well, though making little growth.

2. **D. viridiflora.**—A neat small shrub, with small leaves; of no particular merit; bears, at the beginning and end of the cold season, umbels of small, greenish-yellow, insignificant flowers, and yellow pea-like berries in January.

Gnidia.

G. eroicphala.—A small neat-looking shrub from Peridenia, Ceylon; with narrow lanceolate leaves, about two inches long; bears in February crowded heads of rather small pale-yellow flowers; very pretty when in full blossom. Propagated from cuttings in November.

PROTEACEÆ.

A numerous order of very curious and interesting trees and shrubs, comprising the beautiful species of Banksia, Protea, Hakea, and Dryandra, natives almost exclusively of the Cape and New Holland, of which scarcely a single plant has been found capable of living in the plains of India.

Grevillea.

1. **G. robusta.**—A lofty tree, native of humid forests in the neighbourhood of Port Jackson in New Holland, where it rises to the height of from 100 to 120 feet; a most noble object, handsome at all periods of its growth, with beautiful dense foliage of fern-like, rich dark-green leaves: bears in March greenish-yellow flowers mixed with orange, of moderate size. This, which is about the only Proteaceous plant we have, has become quite established in our gardens, where the climate suits it well, though it does not attain to any great height here. Its wood is said to be spongy and fragile. Propagated only by seed.

2. **G. buxifolia.**—A small pretty box-leaved shrub from Sidney. Plants of this are to be met with in the Calcutta Botanical Gardens.

LAURACEÆ.

Cinnamonum.

C. Zeylanicum.—CINNAMON-TREE.—A tree of moderate size, with large lanceolate leaves with three parallel nerves; bears in January and February numerous pretty panicles of small white flowers, emitt-

ing rather an unpleasant odour, and possessing none of the fragrance or which the leaves and bark are so well known. Propagated by seed.

Laurus.

L. nobillis—SWEET BAY.—Does not seem to thrive at all in this country. Only poor small specimens in pots are to be met with in the Calcutta Botanical Gardens. Thrives well on the hills.

CALYCANTHACEÆ.

Calycanthus.

C. floridus—CAROLINA ALLSPICE.—A woody unornamental shrub, with rough, large, coarse, lanceolate leaves which, in a cold climate, are said to become very ornamental, as in decaying they turn to a bright yellow. The wood and roots smell strongly of camphor. Flowers described as "dusky purple or dull brown, very fragrant, with a sweet apple-scent, or odour of ripe melon:" thrives well, but does not blossom in the locality of Calcutta.

Chimonanthus.

1. **C. fragrans**—JAPAN ALLSPICE.—Like the last, a coarse-looking, straggling, woody shrub; flowers yellowish, purple within, of the size of an unexpanded Peach blossom, of a most exquisite and powerful odour. In England it is usually trained against a wall, where it blossoms in the depth of winter. It was introduced some years ago from China by Mr. Fortune into the gardens of the Agri-Horticultural Society, where it thrives well, but does not blossom, forming blossom-buds, which drop off without opening. The roots possess a delightful fragrance; easily propagated by layers. 2. **C. fragrans grandiflorus,** a variety with larger flowers.

LEGUMINOSEÆ.

Papilionaceæ.

The plants of this sub-order are exceedingly numerous. Many of the most beautiful are natives of the Cape of Good Hope and New Holland; but scarcely any of these, if any, can be brought to thrive and establish themselves in the plains of India.

Lupinus.

LUPIN.

There are several very beautiful shrubby and perennial species of Lupin, but none that can be kept alive through the hot season in the plains.

Sparteum.

S. junceum—SPANISH BROOM. — This small shrub, so well known for its cheerful bright-yellow flowers, though rarely met with, may, with a little care, be preserved through the hot and rainy seasons. At Ferozepore I raised plants from seed brought from Simla, which survived the hot season and blossomed prettily.

Cytisus.

None of this genus can exist in the plains. Plants of the common Laburnum I have known to be raised from seed, and kept through a hot season or two, but it has been only to dwindle away, and then die without flowering.

Lotus.

BIRD'S-FOOT TREFOIL.

L. Jacobæus.—A small slender shrub, two or three feet high, with graceful airy foliage of ternate leaves, leaflets narrow, linear, an inch long; bears at all times nearly, but in unbounded profusion in the cold season, four or five-flowered umbels of small, brilliant, dark chocolate-coloured flowers, contrasting delightfully with the venetian-green of the foliage. Not an uncommon plant in English gardens, but as found there it affords no idea of the beauty it attains to in this country. There is a variety with bright-yellow flowers. Easily propagated by cuttings laid down in the rains, or from seeds, which is the better plan. The plants do not display themselves to perfection till the second season of their growth.

Indigofera.

INDIGO.

The plants of this genus are shrubs with pinnate leaves of very small leaflets. The species are very numerous, several natives of India. The following, however, are the only ones perhaps sufficiently ornamental to merit admittance into the garden; all raised from seed.

1. **I. atropurpurea.**—A shrub five or six feet high; bears in the cold season numerous erect spikes of largish, fine purple flowers. After having once flowered it becomes unsightly. It is best then to destroy it, and raise fresh plants from seed.

2. **I. violacea.**—A small shrub, three or four feet high, of exquisite beauty in the cold season, when blossoming with its racemes of small rose-coloured flowers in unbounded profusion.

3. **I. decora.**—Described as "a dark-green handsome bush, with flowers in large pendulous racemes of delicate pink or rose colour." Plants were introduced by Mr. Fortune from China some years ago into the Agri-Horticultural Society's gardens, but did not thrive there, and have since perished.

Psoralea.

A genus of Cape plants, bearing racemes of beautiful deep-blue flowers. Dr. Voigt says :—" Several species have been cultivated here repeatedly, but without success." At Ferozepore, however, I raised plants of two or three species, which blossomed prettily within a few months from the time of sowing.

Amorpha.

A. fruticosa.—A small indigo-like shrub, bearing in March racemes of small, dark, bluish-purple flowers; met with in the gardens of the Agri-Horticultural Society.

Tephrosia.

T. candida.—A shrub of moderate size, with soft agreeable foliage of pinnate leaves, with fourteen or more pairs of smooth leaflets, of an ashy-grey colour on their under-surface; exceedingly beautiful when in full blossom in September and October, with numberless large, drooping, white, butterfly-like flowers. Propagated from seed.

Wistaria.

W. Sinensis.—A large, strong-growing, climbing shrub, and well-known ornament on houses in England, with handsome, pinnate foliage; leaflets in four or five pairs, oval, acuminate, smooth, those at the base three, and those at the apex four inches long: bears in the hot season large racemes of large pale-purple flowers. In the climate of Calcutta it thrives indifferently, the stems being very apt to die back. Sir J. Paxton says that rigid pruning is indispensable to make it bear, on spurs instead of on big branches, and that plants cut down to within a short distance of the ground acquire a shrubby habit, and then

produce flowers abundantly, having a most interesting and beautiful appearance. Succeeds well in Upper India. Propagated by layers.

Agati.

A. grandiflora—*Buko.*—A small, very common tree, unsightly with its long bare stems, but producing very large, handsome, pendulous flowers of two varieties, white and red. Plants raised from seed come into flower within a year, when about three or four feet high, and when of that size are rather ornamental. After these have flowered it is best to destroy them, and then raise fresh plants from seeds. Dr. Voigt mentions a double-flowered variety. **A. Albiflorum** bears white flowers only.

Clianthus.

C. puniceus—GLORY-PEA—PARROT'S-BEAK.—A shrub of moderate size, bearing flowers somewhat resembling lobsters' claws, two or three inches long, pendulous, bright scarlet. This showy plant, though easily raised from seed, is immediately killed on the approach of the hot season. **C. Dampieri** is grown here successfully as an annual, and is a beautiful object when in bloom, with flowers similar in shape to the last, only larger, and of a more intense scarlet, with black base.

Sutherlandia.

S. frutescens.—A native of the Cape, a shrub very similar in character to the last, but smaller in every respect, with flowers not a quarter the size, but more numerous, and of a brighter scarlet. Plants are easily raised from seed, and kept alive with no great difficulty through the hot and rainy seasons, but never seem disposed to bear flowers in the plains.

Swainsonia.

A genus of pretty herbaceous plants about two feet high, with twining stems, and foliage resembling that of an Indigo plant; natives of New Holland. Plants may be easily raised from seed procurable from seedsmen in England. Sow in June. They require shelter during the rains. They blossom here, but are not long-lived.

S. galegifolia.—Bears charming pea-like flowers of moderate size, of a delicate rose colour, with a small white spot on each wing, in April.

Lathyrus.

L. latifolius—EVERLASTING PEA.—Plants raised from seeds and placed in a sheltered situation during the hot and rain seasons, I have

known to be kept alive several years in the vicinity of Calcutta, but they have shown no tendency whatever to blossom.

Lourea.

L. **Vespertilionis.**—A small, erect herbaceous plant, two or three feet high, hardly to be considered ornamental, but interesting for its foliage of curious crescent formed leaves. Flowers insignificant. Raised from seed in the rains.

Uraria.

1. **U. macrostachya.**—A small shrubby plant, with pinnate leaves of oblong leaflets, three inches long, remarkably beautiful when in blossom in September, bearing erect a spike four or five inches high of crowded flowers of a delicate rose colour. Raised from seed.

2. **U. picta.**—*Sunko juta.*—A weed of this country, but pretty for its foliage of long, narrow strap-like, pendulous, dark-green leaves; bears in the rains long rigid racemes of small red flowers. Raised from seed in the rains.

Dosmodium.

D. gyrans.—THE MOVING PLANT.—A small herbaceous shrub about two feet high, with trifoliate leaves of smooth oval leaflets, two and a half inches long; interesting for the perpetual jerk like motion with which the slender leaf-stalks sway to and fro, but in no wise ornamental. Raised from seed in the rains.

Dicerma.

D. pulchellum.—A small shrub, about three feet high, with trifoliate leaves, interesting both when in flower and in seed for the curious and pretty way in which the flowers, borne in long erect spikes, are unfolded and concealed between two small orbicular leaves. Raised from seed in the rains.

Clitoria.

1. **C. Ternatea.**—MUSSEL-SHELL CREEPER.—One of the most common and at the same time one of the most beautiful creepers of our gardens, though rather a rambling and untidy plant, and difficult to keep in order; leaves pinnate, with two or three pairs of oval leaflets. In blossom at nearly all seasons, with its handsome flowers sparkling among the fine verdant green foliage. There are three or four varieties, one with the flowers of a deep indigo blue, one with the flowers

azure blue, one with pure white flowers, and one with double flowers. Plants are raised from seed during the rains.

2. **C. heterophylla.**—A very beautiful little climbing pot-plant, with slender, thread-like stems, and delicate foliage of pinnate leaves, the leaflets varying curiously, some being of the size and form of a gum-wafer, and others of a narrow oblong form; bears in the hot season pretty, small, pale-blue flowers. Raised from seed in February.

3. **C. erecta.**—A plant of upright growth, with thick leathery leaves; bears in the hot season large, handsome, pale lavender flowers. Raised from seed in February.

4. **C. sp.**—Unnamed in the Calcutta Botanical Gardens, somewhat similar to the last, bears very large, handsome, double flowers. Raised from seed in the rains.

Centrosema.

1. **C. Plumieri.**—A large twining plant of dense foliage with trifoliate leaves of large ovate leaflets; bears in the hot and rainy seasons large, beautiful, pure white flowers with a puce spot in the centre, the merit of which, however, is much lost from their lurking concealed in the foliage. Propagated easily by its rooted runners, or by seed, which it yields abundantly in the cold season.

2. **C. Virginianum.**—Bears large purplish flowers.

Kennedya.

A genus of New Holland, slender climbing plants, some bearing a strong general resemblance to runner-beans. They are easily raised from seed sown in the rains, but in the vicinity of Calcutta they never bear flowers, nor can they for any length of time be kept alive there. In Upper India, however, they succeed well.

Erythrina.

1. **E. herbacea.**—A small shrub about two feet high; bears in March racemes of crimson-scarlet flowers of moderate size; the loss of its leaves during the time of flowering detracts greatly from the beauty of this plant.

2. **E. Blakei.**—A rare plant; considered the most beautiful of the genus, bearing in April flowers of the most brilliant scarlet colour.

3. **E. Indica**—*Pahta Mundur.*—A tree of moderate size, very common in hedgerows about Calcutta, as well as in the other parts of India; exceedingly showy, when in March it becomes a perfect blaze with its handsome clusters of large, brilliant scarlet

flowers borne at the ends of its stems, being perfectly leafless at the time. At other times, it is a thorny, coarse, disagreeable-looking object, not by any means ornamental to the garden.

4. **E. Hendersoni.**—A small shrub in the Calcutta Botanical Gardens; has been several years there, but has not blossomed.

5. **E. Crista Galli**—COCK'S-COMB; CORAL-TREE.—A small shrub; bears during the hot months large erect clusters of rather dull-crimson flowers, not nearly so fine in colour as some of the foregoing, but more ornamental from the plant being in full leaf at the time. The stems die back in the cold season, and should then be well cut in. "The great roots," it is said, "may be taken up at the end of autumn, and kept in the manner of Dahlias, and replanted in the open ground in the May following."* Sir J. Paxton says it is "one of the finest of exotics, and an inestimable ornament," and that it is a good plan to "plant it in suspended baskets"; that "it requires a light soil and good drainage, as it will not endure much moisture." Plants, however, thrive well in the open border in our Indian gardens, and, moreover, when in flower do not seem to merit the high praise here bestowed upon them. Propagated from cuttings, or raised from seed during the rains.

6. **E. corallodendron**—RED BEAN-TREE.—A small bushy tree and most superb ornament to the garden, when in February and March it bears in profusion its sprays of large dazzling flowers of brilliant red, contrasting beautifully with its abundant foliage of verdant deep-green leaves. Of rapid growth, and propagated readily from seed during the rains.

7. **E. Bellangerii.**—Lately introduced.

8. **E. Laurifolia.**—A dwarf plant, with laurel-like leaves, bearing brilliant scarlet flowers. **E. Stricta, Parcelli,** and **Marmorata** are recent introductions, and are of dwarf growth, being on that account valuable additions to our garden favourites of this genus. Most of the foregoing can be propagated by cuttings in sand during the rains; while those bearing seed can be raised by sowing during the rains.

Phaseolus.

P. Caracalla — GREEK CREEPER—SNAIL-FLOWER. — An interesting twining pot-plant: bears in August large handsome white flowers, tinted with rose colour; the unexpanded buds having a curious resemblance to snail-shells. Raised from seed in the rains.

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* 'Le Bon Jardinier.'

Flemingia.

1. **F. strobilifera.**—A small shrub with ovate leaves; flowers small and insignificant, but arranged in a curved raceme, each overlapped in a most curious way by a large pair of kidney-formed inflated leaves. Raised from seed during the rains.

2. **F. Chappar.**—A small shrub; bears its flowers in the same curious way as the last, and is distinguished from it by its heart-shaped leaves. Both are very ornamental when in blossom. Raised from seed during the rains.

Abrus.

A. precatorius—WILD LIQUORICE—*Gungchee.*—A creeping, herbaceous plant, the principal interest of which consists in the pretty little seeds it displays in its open seed-pods. These are egg-shaped, of the size of a pea, of a bright scarlet colour tipped with black. They are used as weights by goldsmiths, and are often strung in the manner of beads for necklaces. There is a variety with white seeds resembling ivory. The flowers are small, pale purple, and not interesting. Raised from seed during the rains.

Dalbergia.

D. Sissoo.—This, though a common jungul tree, and unsuited for the garden, deserves a place in some out-of-the-way corner for the fine fragrance with which its profusion of small greenish-white flowers perfumes the air in the evening. There are two or three other species of Dalbergia, the names of which I have been unable to ascertain to a certainty, which are exceedingly ornamental when in blossom, with an unbounded profusion of sprays of sparking bluish-white flowers. There is a variety with dropping branches like the willow.

Sophora

S. tomentosa.—A large shrub with handsome pinnate foliage of about fifteen or more roundish-oval leaflets; bears in June and July large erect clusters of bright-yellow flowers, somewhat similar to those of the Laburnum; very showy. Raised from seed during the rains.

2. **S. violacea.**—A pretty, indigo-like, small shrub, bearing in October racemes of violet-coloured flowers with dark eye: recently introduced. Raised from seed sown in August.

Virgilia.

1. **V. aurea.**—A pretty little shrub with pinnate leaves of about ten pairs of oval smooth leaflets; bears yellow, Laburnum-like clusters of flowers in the cold season. Raised from seed sown in September.

2. **V. Capensis.**—A tree of some size; bears in boundless profusion pale-purple and white flowers, emitting a most delightful fragrance; thrives well in the Nilgherries, where it is perpetually in blossom. Dr. Voigt says that it has been cultivated near Calcutta, but without success.

Castanospermum.

C. Australe—MORETON BAY CHESTNUT.—An Australian tree of considerable size; thrives well in the Bangalore Public Gardens, where in March it produces its large crimson, beautiful flowers. Small plants of it only are to be met with about Calcutta, although it is many years since it was first introduced.

CÆSALPINEÆ.

Hæmatoxylon.

H. Campechianum—LOGWOOD.—A slender tree about ten feet in height, with small shining leaves, and of very light and elegant growth. Flowers small, yellow, borne in vast profusion in February, in small catkin-like racemes, very fragrant and beautiful. Mr. Gosse observes:—"The likeness of this tree to the Hawthorn of Europe is very striking, and has been noticed by many. A stranger might infallibly mistake it for that familiar tree."* Propagated by seed and cuttings in October.

Parkinsonia.

P. aculeata—JERUSALEM THORN.—A tree-like shrub, from fifteen to twenty feet high, remarkable for the clear, vivid, polished green of its trunk and stems, with pinnate foliage of minute leaflets; nearly always in blossom with racemes of small yellow flowers. Don considers it "a most elegant shrub when in flower"; but in this country, where it is so common, few possibly will entertain the same high opinion of it. In the North-West of India, on account of its rapid growth,

* 'Sojourn in Jamaica,' p. 370.

as well as for its formidable thorns, which render it perfectly impenetrable, it is often employed for hedges. It is, however, regarded as very baneful to other plants growing near it. Propagated from seed in the rains.

Poinciana.

1. **P. pulcherrima.** — PEACOCK-FLOWER — BARBADOES PRIDE — FLOWER-FENCE—*Krishn-churra*—A large thorny shrub with bipinnate foliage of oblong leaflets; bears during all the hot and rainy seasons, at the end of its stems, considerable-sized panicles of large showy flowers. There are two varieties, one bearing yellow, and the other scarlet flowers. It should be cut in closely in the cold season, as it is apt to grow very straggling, and the old stems look decrepit and unsightly. But the better plan perhaps is to destroy the old plants altogether, and raise fresh ones from seed. It hardly bears the cold of the Punjab, but thrives there during the hot months better, perhaps, than in Bengal. I have seen plants there, eight months from the time they were raised from seed, produce immense, erect, tuft-like racemes of blossom, so compact as to quite conceal the flower-stalks, being then objects of great beauty. Sow the seed in the rains.

2. **P. elata.**—A large tree, native of Coromandel; bears in the hot season racemes of large, gaudy, yellow flowers. Propagated by seed during the rains.

3. **P. Gilliesii.**—A small shrub three or four feet high, native of Mendoza, with remarkably pretty, feathery, bipinnate foliage of minute leaflets; bears during the hot and rain seasons panicles of large flowers with pale-yellow petals, which rarely expand, but from out of which proceed very long crimson stamens. Sir W. Hooker speaks of it as "a charming plant." After two seasons it is apt to decay and look unsightly; it is therefore best to raise fresh plants every year from seed, and throw the old worn-out plants away. When in seed the seed-pods should be covered, before half-grown, with muslin, to protect them from the ravages of an insect which rarely fails otherwise to penetrate them and destroy the seed. Sow in the rains.

4. **P. regia.**—FLAME OF THE FOREST.—A large tree, native of Madagascar, called by the French Flamboyant. When young, the foliage is very handsome. Bears in April and May immense panicles of large scarlet and yellow flowers. Though when in blossom a most superb object in itself, it is ill-adapted for a garden, as the vast quantity of red it displays is highly injurious to the effect of other flowering-plants. It is of exceedingly rapid growth, very apt to be damaged by strong winds, and apparently of not long duration. Propagated from seed, which it bears abundantly. Sow in the rains.

Cæsalpinia.

1. **C. coriaria.**—A small spreading tree, hardly suited for the garden, but well deserving a spare place in the outskirts of it, for the most delightful aromatic odour diffused by its racemes of small white flowers when in full blossom in October. Propagated by seed.

2. **C. Grahami.**—A handsome, exceedingly thorny shrub, seven or eight feet high, with deep, verdant green, dense foliage of pinnate leaves, of six or seven pairs of oblong leaflets, two-and-a-half inches long; throws out, principally from its summit, in the cold season dense, solid-looking, tapering, brilliant-coloured spikes ten inches long; the opened flowers at the bottom of the spike yellow, and the unexpanded buds towards the end of it of a rich scarlet crimson. A truly superb object during the long time it continues in blossom. Propagated by layering.

3. **C. paniculata.**—Dr. Hooker describes this as "a magnificent climber, festooning the trees with its dark glossy foliage and gorgeous racemes of orange blossoms." Dr. Voigt says the flowers are fragrant, and are borne in the cold and hot seasons.

Colvillea.

C. racemosa.—A large tree, thirty feet high or more, native of Madagascar, with handsome pinnate foliage of very small linear leaflets; bears in September, principally upon its summit, large, erect, cone-like racemes of bright orange-coloured flowers, presenting then a very noble and showy appearance. Propagated from seed.

Cassia.

A rather numerous genus, consisting mostly of trees or shrubs; only a limited few of a sufficiently ornamental character to merit a place in the garden. Nearly all easily propagated from seed.

1. **C. fistula** — PUDDING-PIPE TREE — *Amultas.* — A small tree common all over India, with noble, dense, dark-green foliage, of broadly ovate large leaflets; bears, when in blossom in May, considerable resemblance to the Laburnum, to which, however, in my opinion it is far superior. It has "the foliage of the Ash and the inflorescence of the Laburnum," according to Dr. Masters. Dr. Roxburgh well describes it as "uncommonly beautiful when in flower, few surpassing it in the elegance of its numerous long pendulous racemes of large bright-yellow flowers, intermixed with the young lively green foliage."

The flowers have a faint and delicious odour. Remarkable also for its curious cylindrical black seed-pods, as much as two feet long.

2. **C. marginata.**—A small tree with widespreading branches and graceful small-leaflet foliage; remarkably beautiful in the hot season, when in blossom, with its profusion of racemes of small rose-coloured flowers, looking at some distance off like the flowering Ribes. Major Drury considers it "something like the Weeping Ash." A common plant on the Madras side, but I have not noticed it in the gardens about Calcutta. Dr. Wight says it is so nearly allied to the following as to be frequently confounded with it.

3. **C. Javanica.**—C. bacillus of Roxburgh, who describes it as a native of the Malay Islands, blossoming in the hot season with racemes of flowers of a lovely pink or rose-colour, and says, "when in flower it is by far the most beautiful Cassia I have yet seen."

4. **C. Florida.**—Dr. White describes this as "a small but beautiful tree, particularly when in flower, every branch of it terminating in a large panicle of deep yellow blossoms." It is in flower at nearly all times of the year.

5. **C. glauca.**—A very common small tree with widespreading branches; bears during the latter half of the year racemes of large sulphur-coloured flowers.

6. **C. Australis.**—A shrub of about ten feet in height; very ornamental for its deep green, handsome, small-leaflet foliage, and the spreading habit of its branches, but of extraordinary beauty when in full blossom in October, and profusely covered with its large close racemes of bright golden flowers.

7. **C. alata.**—*Dad-murdun.*—A remarkably stately shrub of spreading habit, and occupying a considerable space of ground, with noble foliage of great, obovate, oblong leaflets; extremely handsome when in full blossom, in the cold season, it lifts aloft its great terminal cone-shaped racemes of closely-packed, large, deep-yellow flowers.

8. **C. auriculata.**—A small, very common shrub, with dense, agreeable foliage, easily distinguished by the ear-like appendage between each pair of leaflets; ornamental when in blossom in the cold season, with its abundant large yellow flowers.

9. **C. Macraei.**—A small shrub with pretty delicate foliage: ornamental when covered in profusion with its small golden flowers.

Brownea.

A genus of flowering shrubs or small trees, of unrivalled splendour, in character and foliage bearing a strong general resemblance to Amherstia, but totally unlike that noble tree in the appearance of their

blossoms. The three species described below thrive and blossom exceedingly well in gardens about Calcutta. They are propagated by layers. Natives of the shady thickets of the West Indies.

1. **B. ariza.**—A shrub or small tree; bears in March from the end of its stems, which it drags down by its weight, a cluster of blossoms of prodigious size, much resembling a bunch of Rhododendron flowers; of a fine deep rose colour, and of extraordinary beauty.

2. **B. grandiceps.**—Sir J. Paxton writes of this and the preceding :—

"Their flowers are produced in a short spike, tier above tier, every day witnessing the expansion of a new tier above those of the former days, till at last the whole mass becomes a globe of living and glowing crimson. This brilliant head appears on the side of the main stem among the leaves. Every evening they rise up and lift themselves from the blossoms to expose them to the dew, so that each morning these beautiful objects lie uncovered; but as day advances, the leaves gradually droop and bend down over the flowers to guard them from the rays of the sun."*

3. **B. coccinea.**—A small tree, eight to ten feet high, of handsome compact growth. Bears in March smaller heads of flowers than the preceding, but more numerous, and of a bright scarlet colour, exceedingly gorgeous and dazzling. They diffuse a faint sweet odour for some distance.

4. **B. antiguiensis** is likewise now found here.

Amherstia.

A. nobilis.—This celebrated tree has been described as about the most beautiful object in the whole vegetable creation; and certainly, when in full blossom in February and March, well asserts its claim to be considered so. The immense, pendulous, candelabrum-like clusters of fine red and yellow flowers, drooping from all parts of the tree among the handsome foliage, present an appearance of astonishing elegance and loveliness. When out of blossom, it is highly ornamental for its fine hanging foliage of pinnate leaves, with six or seven pairs of lanceolate pointed leaflets seven inches long,

It was first brought into notice by Dr. Wallich, who introduced it from Martaban, though there seems considerable doubt whether that is its native locality. It has now become pretty well established in several of the gardens in the vicinity of Calcutta, far north of which it would in all probability be unable to exist.

It is propagated easily by layering; but the young plants, when put out in the spot selected for them, require great care, or they are

* 'Flower Garden,' ii, p. 108.

sure to die off. The late Mr. John Scott was of opinion that the best time for layering is in the hot season soon enough that the layered plants may be ready to take up and put out in the rains. Layers made in the rains and taken up in the cold season he found nearly sure to die. During the cold months they should have a screen over them to protect them from cold at night; and during the succeeding hot months they need one quite as much in the daytime to shelter them from the dry arid heat of the sun. At the latter period also, being that in which they are in vigorous growth, they should be kept constantly watered. The rain season is the one most congenial to their nature, when they may be safely left to themselves. They luxuriate in an exceedingly rich soil, and are benefited in their growing season by copious supplies of liquid manure.

Jonesia.

J. **asoca**—*Asôca-Britch.*—A tree of considerable size, native of Southern India, somewhat similar to the preceding in foliage, but very dissimilar in its mode of flowering; blossoms in February and March with large, erect, compact clusters of flowers, varying in colour from pale-orange to scarlet, almost to be mistaken, on a hasty glance, for immense trusses of bloom of an Ixora. The flowers emit a faint sweet scent for some distance around. Mr. Fortune considered this tree, when in full bloom, superior in beauty even to the Amherstia—an opinion in which probably many will not concur.

The first time I saw the Asôc in flower was on the hill where the famous rock-cut temple of Kârlee is situated, and a large concourse of natives had assembled for the celebration of some Hindoo festival. Before proceeding to the temple, the Mahratta women gathered from two trees, which were flowering somewhat below, each a fine truss of blossom, and inserted it in the hair at the back of her head, which she had seemingly combed and dressed with uncommon care for the occasion. As they moved about in groups, it is impossible to imagine a more delightful effect than the rich scarlet bunches of flowers presented upon their fine glossy jet-black hair.

The tree yields seed in abundance, from which young plants are easily raised.

Bauhinia.

MOUNTAIN-EBONY.

A rather extensive genus of shrubs and trees, several natives of this country, and all remarkable for the peculiar form of their leaves

which are composed of two oval leaflets, laid side by side, and having their edges near the base united. In consequence of this twin-like union, the genus has been fancifully named by Plumier after the two brothers Bauhin (celebrated botanists of the sixteenth century), as being symbolic of the united labours of the brothers in the cause of science. Some few of the species are very ornamental, and well deserve a place in the garden. They all bear seed, from which they are easily propagated.

1. **B. Richardiana.**—A small tree, about ten feet in height, very ornamental when in blossom in April, with its numerous large flowers, having four of their petals white speckled with red, and the other petal—the lower one—crimson, with a few stripes of white, and altogether resembling those of a handsome Geranium.

2. **B. aurantiaca.**—A small tree; bears in April tawny orange-coloured flowers; of but little merit.

3. **B. acuminata.**—A small tree, about ten feet high, very handsome from being nearly always in blossom with its numerous large pure white flowers. Dr. Roxburgh quaintly remarks, "It is a very specious plant, well deserving a place in the gardens of the curious."

4. **B. tomentosa.**—A small tree, about eight or ten feet high; all the tender parts, except the upper surface of the leaves, covered with a soft down; almost constantly in blossom with beautiful, large, pale, sulphur-coloured, drooping flowers.

5. **B. retusa.**—A considerable tree; blossoms in September with corymbs of numerous small pale yellow flowers, beautifully marked with numerous small purple spots.

6. **B. purpurea.**—A large stout tree; bears in November, in racemes, numerous very large deep rose-coloured flowers.

7. **B. triandra.**—A large tree; bears in November racemes of large white flowers. Dr. Roxburgh says:—

"This when in flower is one of the most beautiful species of Bauhinia I have yet met with; and as it blossoms when so low as three feet, and when not more than one year old, is particularly well adapted for the conservatory."

Dr. Wight expresses himself as all but convinced it is no more than a variety of B. purpurea.

8. **B. variegta**—*Kuchnâr.*—A rather large tree; an object of great splendour when, in February, it becomes one entire mass of purple and white blossom, the large handsome flowers having a strong resemblance to those of a Pelargonium.

9. **B. candida**—A variety of the last, bearing flowers with white and pale yellow petals.

10. **B. corymbosa.**—Native of China; a small scandent, and, irrespective of its flowers, most charming shrub, with exceedingly

slender stems, and very small pretty leaflets, the pairs not at all adherent, as in other species; bears in April middle-sized rosy-white fragrant flowers.

11. **B. diphylla.**—A very pretty scandent shrub, somewhat similar to the last, but of stouter growth; bears in June and July middle-sized pure-white flowers.

Cercis.

C. canadensis and C. siliquastrum—JUDAS-TREE.—Mrs. Loudon says:—

"Few trees are more ornamental in a shrubbery than these two species; but C. siliquastrum is decidedly the handsomest. The leaves are curiously shaped, and the flowers, which are of a beautiful pink, grow out of the bark of the stem and branches; not, like those of other plants, among the leaves. The flowers fried in butter make excellent fritters."

Dr. Voigt states that C. canadensis had been in the Calcutta Botanical Gardens sixteen years without flowering.

Gleditschia.

G. tricantha — HONEY-LOCUST. — "Though of American origin, commonly known now in Italy by the name of Spina Christi." * A large tree that takes its name from the great pods it bears, containing a thick, sweet, glutinous pulp: as met with here, a shrub in no respect ornamental but for its rather pretty small foliage; but this it loses for a long time during the cold season; bears inconspicuous greenish flowers; for its formidable thorns better adapted for a hedge than for the decoration of the garden.

MIMOSEÆ.

Desmanthus.

D. punctatus.—A small shrub, native of Brazil, of prostrate growth, and very sprawling, remarkable for the extreme sensitiveness of its pinnate foliage; pretty when in blossom, with its tassel-like rose-coloured flowers of the size of a bullet; yields seed plentifully;

* 'Gardeners' Chronicle,' April 12, 1862.

except in not being an aquatic, resembles in every respect D. natans; such at least is the description of plants raised from seed sent me from the Calcutta Botanical Gardens, but I have doubts as to the accuracy of the name.

Mimosa.

1. **M. pudica.** — SENSITIVE-PLANT — *Chooee-mooee.* — Native of the West Indies. Very similar in every respect to the preceding, except that it is much smaller and of more slender habit; a very common plant, but a very pretty and desirable one; nearly always in blossom: seeds abundantly, from which it can be raised easily.

2. **M. sensitiva.**—The true Sensitive-plant, though in fact not so sensitive as the foregoing, is altogether different in the character of its foliage; mentioned in Dr. Voigt's Catalogue, but it does not exist in the Calcutta Botanical Gardens now, nor have I ever met with it in this country; like the last, it is a native of tropical America

3. **M. brevipenna.**—A small shrub, of erect growth, ornamental for its exquisitely delicate and beautiful pinnate foliage of minute leaflets; requires to be well cut in to keep it bushy, otherwise it is disposed to grow with long, bare, unsightly stems; but very slightly sensitive.

Acacia.

The number of different species of Acacia is almost unlimited. A great many are natives of Australia, and objects of extreme beauty, both as regards their flowers and their foliage. These Australian species are remarkable for being without true leaves, and developing their footstalks into the form of leaves, called then "phyllodia," which have the peculiarity of always directing their edges to the earth and heavens. Some few of these may be met with at Ootacamund, growing well there; but not one has been found capable of enduring the climate of Bengal. In the Punjab they thrive well, there being above a dozen kinds, and a large number of seedlings have been raised by the Society there. The several species that are natives of India have no pretensions to beauty, being, for the most part, rough jungle plants, quite unfit for admission into the garden.

1. **A. cornigera.**—A small shrub, not ornamental, but curious and interesting for the remarkable large tumid hollow thorns, resembling little horns, with which the stems are thickly covered.

2. **A. modesta**—*Phulaee.*—A small shrub, common in the North-West, where it forms, when kept well cut, a neat and pretty hedge.

3. **A. catechu.**—A large tree, with small and very delicate foliage of bipinnate leaves; the leaflets arranged like the teeth of a small comb; if cut closely in, well adapted for affording a very pretty hedge.

4. **A. Farnesiana.**—SWEET-SCENTED BABOOL.—A small, unsightly, thorny, jungul-tree; but very acceptable when in blossom in the cold season, and covered with its profusion of bright yellow tassel-like flowers of the size and form of a bullet, which emit far around a strong, delightful, aromatic fragrance, much resembling that of Wall-flowers, and retain their scent long after gathered and laid by. At Cannes, in the South of France, the tree is submitted to a very careful system of cultivation and training for the sake of its flowers, which are in great request with perfumers.

5. **A. speciosa**—SIRISS-TREE.—Now placed by Hooker and Bentham under Albizzia. A timber-tree of moderate size, not much seen in the vicinity of Calcutta, but a prominent object in most of the gardens of the Upper Provinces: flowers large, tassel-like, pale-green, diffusing widely around an exquisite perfume, particularly at night. It seems to prefer an arid climate, for it has been in such a locality that I have observed it thrive most vigorously. Trees of it are very numerous at Cairo.

6. **A. decurrens.**—Sir J. Paxton says it is "a magnificent plant with handsome foliage, occupying half a panel of conservatory-wall at Chatsworth;" introduced into the Gardens of the Agri-Horticultural Society by Mr. Fortune from China; but its culture was attended with no success, and it does not exist there now.

7. **A. Houstoni.**—A large ornamental shrub, seven or eight feet high; native of Mexico; of recent introduction; with handsome bipinnate foliage, the small narrow leaflets set like the teeth of a comb; bears during the hot months large crimson flowers of bottle-brush form.

All Acasias are easily propagated by seed.

Calliandra.

1. **C. longipes.**—A small shrub, with delicate pinnate foliage; of no great attractiveness; flowers small, pink, mimosa-like.

2. **C. brevipes.**—Native of Brazil; described by Curtis as a "pretty branching shrub, four or five feet high; requires pruning to make it a compact handsome bush; when in flower highly ornamental, its bright-red tufts contrasting with the delicate-green foliage." I have not met with this in India, but in all probability it would succeed well here.

3. **C. hæmatocephala.**—Best known in Calcutta as **Inga hæmatoxylon**; a shrub five or six feet high, handsome at all times for its graceful foliage of pinnate leaves, with wedge-formed smooth leaflets

an inch long; but remarkably beautiful when in full blossom, in the cold season, with its large bright crimson bottle-brush-like flowers; yields seed sparingly.

4. **C. portoricensis.**—A small shrub in the Calcutta Botanical Gardens; native of the West Indies; with pretty, dark-green, graceful, pinnate foliage; bears in March white, moderate-sized, not very ornamental flowers of bottle-brush-like form.

Pithecolobium (*syn. Inga*).

A genus of somewhat handsome-leaved plants of very rapid growth. Rather of straggling habit, and growing to a height of twenty feet or more if not kept down by constant pruning.

P. hæmatoxylon.—A shrub three to five feet high, with dark green foliage, and bearing brilliant scarlet tassel-like flowers during the hot and rainy season and at the end of the cold season.

P. dulcis.—MANILLA TAMARIND.—A large growing shrub, native of Mexico, with handsome dark green leaves. The flowers are insignificant. Well adapted for, and largely used as, a hedge-plant. Must be kept well cut in. Bears curious twisted seed-pods, which are considered very nourishing food for cattle and horses, and on that account, a plant of much economic value.

P. saman—THE RAIN TREE.—A large tree of extraordinary rapid growth, native of Brazil. Its value lies chiefly in the peculiar property it possesses of rendering sterile and alkaline soils fertile. This was discovered by Mr. Charles Maries, F.L.S., late of Durbhunga, who found that, upon planting the tree on soils impregnated with *reh* and saltpetre, they (the soils) were rendered thoroughly fertile.

All of the foregoing are easily propagated by seed sown during the rains.

DRUPACEÆ.

Amygdalus.

A. Persica—SEMI-DOUBLE CHINESE PEACH.—Sir J. Paxton says, "has in all respects the habit of the common Peach. There are two varieties, white and red. Seedlings are said to come true from seed." Introduced by Mr. Fortune into the Agri-Horticultural Society's Gardens, and thus described by him:—

"These are very remarkable trees, common in the gardens of Northern China, where they attain to the size of our English Almond. Nothing can be more beautiful than these when in full bloom. In the

spring they are literally loaded with flowers, as large as our Scotch roses. The carnation-flowered has striped blooms resembling the carnation — hence its name — and sports in a remarkable way, producing striped and self-coloured flowers upon the same tree. As spring flowers they are highly prized by the Chinese. Itinerant gardeners carry them about the streets for sale in the northern Chinese towns. The flower-buds are then just beginning to expand. The buyer puts his purchase in a pot, gives it a little water, and then places it in his window or sitting-room. In a day or two the buds burst, and the little tree is one mass of bloom. They are propagated by budding and grafting, and will grow well in any common garden soil. I ought to add that small plants produce blossoms freely as well as large full-grown trees."*

Plants are distributed from the Gardens of the Agri-Horticultural Society: but here they have not displayed themselves in that beauty of bloom to merit the high praise that has been bestowed upon them.

Cerasus.

1. **C. laurocerasus.**—The so-called Laurel of the English gardens.
2. **C. Lusitanica**—PORTUGAL LAUREL.—Neither of these well-known evergreens exists, nor would, I believe, be capable of existing, in the climate of India.

POMACEÆ.

Cydonia.

C. Japonica.—This well-known handsome flowering shrub Dr. Voigt mentions as existing in the Calcutta Botanical Gardens, and blossoming in the hot season. The plant is not to be met with now, but it might possibly find a congenial home at Ootacamund, or perhaps on some of the hill stations.

Photinia.

P. dubia.—A tree of moderate size, native of Bengal; in full blossom in January, with an unbounded profusion of small clusters of small white flowers, which perfume the air for a great distance with

* 'Gardeners' Chronicle,' Feb. 1860.

the delightful fragrance of the Heliotrope. Propagated by seed sown in October, or by cuttings put down about December.

Rhaphiolepis.

R. Indica.—A small bushy shrub, native of China, with very handsome dense foliage of oval, leathery, saw-edged, shining leaves, three inches long, exceedingly beautiful when in full blossom in February, with its profusion of white flowers of the size and form of a thimble.

R. Japonica integerrima and **R. ovata** are later introductions to our Betel-house; all of them are easily propagated by cuttings put down in January.

Cratœgus.

HAWTHORN.

None of the species of this genus can exist on the plains of India, but succeed well in our hill stations.

ROSACEÆ.

Rosa.

THE ROSE.

Goolab.

It must be within the memory of those now living that the gardens of Bengal at least, if not of all India, hardly possessed a Rose that was worthy of the name. It is over fifty years ago that the Rose Edouard was introduced. Previous to that there was nothing better to represent this lovely race than the common China, the Musk, and the Bussora, putting forth a show of blossom for one short season, and shabby and disagreeable all the rest of the year. The old beautiful so-called Summer Roses of Europe, if introduced, were found unable to exist here. But a great change has taken place within a very recent period. Races of Roses entirely new, the Teas, the Noisettes, the Bourbons have come into existence, and happily found in India a home thoroughly congenial to them.

But the same uniform success has not attended the introduction of the Hybrid Perpetuals, at any rate in Bengal. Some have proved charming acquisitions, but a large number, it has been found, are not

deserving a place in our gardens at all; some being unable even to exist here for any length of time, and others, though thriving vigorously, seldom or never yielding flowers. Several, moreover, that do blossom, though deservedly of high reputation in Europe, produce in this country small and not very double flowers, frequently only semi-double, very deficient in depth of colour, and greatly wanting in due richness of perfume.

But this is not all. Many of these Roses also, extolled in the catalogues of English dealers, are in truth unworthy of notice; while many again are so similar to others of a different name that professional Rose-growers themselves can hardly distinguish them. In India, too, this similarity, it seems to me, has a tendency to become even more positive, peculiarities that might perhaps be recognised in a European climate often becoming here entirely lost. This is, however, not the case on the hills.

Considering the large number of Roses now existing in India, and the ease with which they may be multiplied, few perhaps would care to procure them from Europe. Those, however, who desire to obtain new varieties will find ample directions in regard to their mode of conveyance and treatment on arrival, given at page 96. I would only here observe that Roses, to bear being sent from England in the rude way in which they are usually conveyed, should be stout plants, two or three years old upon their own roots, if such are to be had. Nurserymen, however, seldom keep such plants, or cultivate any but budded Roses. But Dwarfs budded on the Manetti stock, for purposes of conveyance, are perhaps all but as good as those on their own roots. These are always to be had, and are best to be ordered. Standards or Half-Standards, that is Roses budded upon the Briar from two to four feet high, should never be sent for, as the length of the stems not only adds to the trouble and expense of sending, but is rather unfavourable than otherwise towards the budded part retaining its vitality. Plants budded on the Manetti stock have the bud inserted low down near the root of the stock, and should be always planted with the budded part an inch below the ground. In that case in course of time the Rose forms roots of its own; and the stock of the Manetti, on which it has been budded, ultimately dies.

Some of the plants sent out on their own roots may appear to have perished, and to be quite dead. Never take it for granted that such is the case; plant them, notwithstanding, and take all possible care of them; they often recover themselves and push forth again when least expected.

The propagation of plants generally by layers and cuttings has been treated of elsewhere, but a few remarks may here be made especially applicable to the Rose.

Layering.—The layering of many Roses may be performed at all seasons of the year, but with some few of the choicer kinds it will prove most successful in either October or February.

Mr. Errington very kindly communicated to me the following happy method he adopted for layering Roses. He plunges a pot filled with soil in the ground, at the place where the layer is to be made, and layers the Rose in the usual way. This is done in February shortly before the hot season. He then places another pot upon the soil of the pot in which the layer has been made, half fills this upper pot with earth, and keeps the remaining half always filled with water. The water slowly trickles down to the layer below, and keeps it constantly moist. The layer is ready to be cut by the beginning of the rains.

Cuttings.—The best season for laying down cuttings of Roses is undoubtedly in November, about the time that the annual pruning is done. By March they become nice little rooted plants, and may then be taken up and potted off. Cuttings of vigorous and healthy growth from the Tea-roses, Devoniensis and Elise Sauvage will, I have found, strike readily if put down in July during the rains.

I am indebted likewise to Mr. Errington, some time head-gardener of the Agri-Horticultural Society, for the following particulars respecting his mode of raising Roses from cuttings. To strike them in he uses a mixture of one part of fine charcoal to three of sand. One advantage of this mixture, he says, is that the cuttings, when struck, will continue growing and thriving; but that when struck in sand alone, they must be removed and potted in soil, or they soon die. He always uses slips with heels of the old wood. He takes care to lay the heel of the slip against the side of the pot, but not the whole length of the slip. He says the mixture cannot be pressed too closely round the slips. He covers them with a bell-glass.

Cuttings in water.—During one cold season I made experiments on striking cuttings of Roses in bottles of water. The ones I attempted were the delicate Tea-roses Devoniensis, Elise Sauvage, and Peel's Rose, and with each I met with complete success. The following I found the points essential to be attended to :—

The water must be perfectly clean and pure, and changed frequently to keep it so. Not more than one or two slips must be put in the same bottle, or the water will become corrupt and the slips rot.

The slips must be of the youngest growth, the foot-stems of a flower that has just blossomed and fallen off.

The bottles should be placed on the north side of the house, or behind some screen where they may have plenty of light without sunshine, and be sheltered from wind. An old box, without the lid, laid upon its side, with the outer surface of the bottom facing the sun, serves admirably for putting the bottles in.

Small vials do not contain water enough; ten-ounce confectionery bottles should be used; tumblers will do, but are rather inconvenient.

It is exceedingly interesting to watch the cuttings gradually form their callus, as they will completely do in about three weeks, and then some time after emit one or two white silvery fibrous roots. As soon as they do this, they should be potted off at once.

Budding.—The budding of Roses is performed with the greatest facility and success in the Upper Provinces, and by this method choice Roses may soon be multiplied there to any extent. The kind employed for a stock is the Rose Edouard and the Grant Rose, which grow there with great vigour, the bark yielding most freely to receive the bud. The operation may be performed in February.

In Bengal, from the difficulty of finding a stock the bark of which will separate freely from the wood, budding is seldom or never attempted. Buds of any valuable Rose, however, one chances to obtain may be turned to account, sacrificing some common young Rose-plant by cutting it completely down, removing the soil, and inserting the buds upon the stump or upon the root, the bark of which will always yield readily.

But there is one mode of proceeding by which, if adopted, budding would succeed probably as well in Bengal as elsewhere. And this is a matter of some importance, as when Roses have become multiplied in this way, it may possibly be discovered that there are those which in India, as in England, succeed well when budded on another stock, but indifferently grown on their own roots.

The plan would be very similar to that given by Mr. Rivers. Lay down in an open piece of ground in the rains a good supply of cuttings of Rose Edouard, about a foot long, having first removed all buds but the lowermost one at the base of the cutting and the two uppermost. Lay the cuttings as slopingwise as possible, burying as much as two-thirds of them, so as to leave only the topmost bud exposed, and press the earth firmly down upon them. When they have struck and become thoroughly established, they will be ready for budding upon; but they must be left just as they are till required for that purpose. At that time the earth must be removed, the upper part of the cutting laid bare, and the bud inserted in the usual way as low down on the stock as can conveniently be got at. The bark of the stock, it will be found, will always part readily, so long as kept moist by being let to remain beneath the soil.

Grafting.—Grafting, or more properly inarching, is the practice that is uniformly adopted in Bengal for the propagation of the choicer kinds of Roses—in my opinion a very inferior mode of proceeding. The stock employed for this purpose is of the Rosa gigantea and the China Rose (Duc de Berri). The best time to perform the operation is November,

or as soon after as the plants have made new growth after the annual pruning.

Standards.—Standard Roses are rarely seen on the plains of India. These, when in full blossom, present a very handsome appearance. On the hills it is different, as it is possible to make very fine standards there. Of course in this country, where high winds prevail, they require stout stakes or iron rods for their support, even more than they do in Europe. The stocks employed are of the Rosa gigantea or multiflora.

Pillar Roses.—Roses when trained in this way (and it is only such as make long and vigorous shoots that can be so) have a very beautiful appearance. Proceed thus :—Cut away clean from the ground all but three stems, and train these to a stout stake or bamboo, six feet or more high. To induce these stems to produce flowering shoots along their whole length, in October shorten their tops, unfasten them from their stake, and lay them at full length upon the ground. Left thus in a horizontal position, the buds upon them will break into shoots, which otherwise they would not have done. When they have done so, carefully raise the stems and bind them to their stake again. These sidelong shoots, pruned back after flowering, will form the blossoming spurs in after-years. The main stems, however, are said soon to wear out, when they require to be cut completely down and replaced by fresh ones.

Situation and soil.—Roses, raised either from cuttings or layers, will come into full perfection of bearing by the second season after they have been planted out, particularly if they have received liberal treatment. They do not like a wet, undrained soil, and as little do they like a dry and arid one. It is therefore best to plant them in a gently raised bed, from which the superabundance of wet during the rains may pass off; but as a situation of this kind subjects them to a greater degree of drought during the hot months, they must at that season be, from time to time, liberally supplied with water. Generally speaking, they suffer during March more than at any other period of the year. In that month it not unfrequently happens that the leaves are entirely devoured by some insect that seems to prey upon them during the night.

A writer in the 'Gardeners' Chronicle states that "charred garden refuse is used largely by Messrs. Wood in the cultivation of Roses;"* and Mr. Rivers recommends turves pared thinly and baked in an oven, or roasted upon an iron plate, as an excellent ingredient to mix in the soil for Roses.† Acting upon this I have made parings of Doob grass, laid them several days to dry in the sun, pulled them to bits, and roasted them in an earthen vessel on a chulah. Using this abundantly with

* No. for July 30th, 1859. † 'Rose Amateur's Guide,' p. 175, 6th ed.

common earth and old cow-manure, I have found not only Roses but other potted shrubs thrive in it most vigorously.

Roses love now and then an entirely new soil, and transplantation every year or two is the very best thing that can be done for them. When not transplanted, they should, in October, after the rains are over, have their roots laid bare by the removal of the earth for two or three weeks, and then covered in with new soil, well enriched with old cow-manure or, better still, well-rotted night-soil.

Surface-dressing during the months of December and January I have found of prodigious benefit, making the plants break forth with wonderful vigour. Drawing the earth away from the stem, so as to form a circular ridge at a foot's distance around it, I throw into the shallow basin thus formed a basket of fresh cow-dung, and from a considerable height pour water upon it. The water thus passes into the soil as a thick liquid manure. A fresh quantity of cow-dung is applied at the interval of about a month.

Pots and ring-pots.—When well-cultivated, Roses appear to me to thrive and blossom far more satisfactorily in the open ground than they do in pots. A common mode of cultivating Roses, and one of which the natives are very fond, is to grow them in ring-pots. These are earthen cylinders, sixteen inches in diameter and two feet long, let into the earth endwise about a foot deep, and filled with soil to within three inches of the rim. The method of the natives is to cut the Roses, planted in these, completely down, to within two or three inches of the roots in October; a week or two later to remove the soil from the roots, and, having left them exposed a few days, to fill in with a solution of oil-cake of the consistency of thick mud, very offensive to the nose at the time. The plants under this treatment, it is true, blossom very beautifully a month or so afterwards, but it is a mode of cultivation that possibly would not suit every one's taste.

Rose culture on the hills.—The cultivation of Roses on the hills is attended with far more satisfactory results than on the plains. They come to astonishing perfection, quite unknown on the plains, even with very little care and attention. Especially is this found to be the case with Roses in pots.

Having secured a stock of plants, say in October, very little can be done beyond plunging the pots containing them into the ground, with a shelter overhead of some sort to protect them from the effects of the severe winter. At this time they require very little water—only just sufficient to keep them alive.

About the middle of February, the pots should be taken up, the plants pruned in thoroughly, and repotted in fresh soil and a size or so larger pots. Begin watering now a little more liberally. By the beginning of March the leaf buds will begin to swell, and by the end

of the month, they will have burst into leaf and formed young branches. They should be copiously watered at this time, occasionally with liquid manure. The flower buds will begin to show themselves about the third week in April, as a rule, and from May to November they will go on blooming in great profusion, according as the class to which the plants belong. June, however, is the month when Roses are at their best on the Hills.

In order to have a constant succession of flowers, the branches that have made vigorous growth, and have finished blooming, should be cut back to within six eyes, when they will push forth new growth again. It is, under any circumstances, best to cut back all branches that have done flowering, as otherwise they exhaust the plant. When this is not done, the plants assume a ragged and straggling appearance, do not bloom, and exhaust themselves very soon.

In pruning, one golden rule should always be kept in view. It is: "The more growth, the less pruning, and *vice versâ*." Plants of vigorous growth do not need severe pruning, but only require the removal of old and worn-out wood, and the current year's growth to be cut back to within six and nine eyes. Plants of feeble growth should be unsparingly pruned. Two eyes, or at the most three, should be left in the case of the current year's growth; while the old wood should be entirely removed with a clean cut of the knife.

Great discrimination is, however, required in pruning, and success can only be attained by constant practice and observation. So many different points have to be taken into consideration that no hard-and-fast rules can be laid down in this connection. As a general rule, however, it may be stated that Tea, Noisette, and China Roses scarcely need any pruning beyond the removal of the old worn-out and dead wood. All others—especially the Hybrid Perpetuals—are greatly benefited by a vigorous application of the pruning knife. But, as has been observed above, judgment and discrimination must be exercised; and it is well to weigh all essential points before commencing operations. For pruning purposes, the new Sécateurs, or French pruning shears, now to be had of any iron-mongers of Calcutta, Bombay, and Madras, will be found best, as there is less risk of disturbing the roots of the plants, which often happens when the knife is used, especially by less experienced growers.

On the Hills, Roses can be propagated either by cutting, layers, or budding. All three methods are equally successful. The best time to put down cuttings is in February, after the annual pruning. But, unlike the plains, cuttings will strike readily at any time between February and October. Layering is best done from July to September; while for budding, May is certainly the best month.

In putting down cuttings, it will be found that if glazed frames with

bottom heat are used, the percentage of successes will be very large. Nothing but pure sand, mixed with charcoal pounded fine, should be used for putting down cuttings in. It is a mistake to use any other soil, although, when pure sand is not available, common garden mould must of necessity be used.

One essential point in Rose culture on the Hills is the watering. Unlike the plains, the supply is not abundant, and yet it is essential that when the plants are in vigorous growth, they should receive a plentiful supply of the precious fluid. Nevertheless, the general tendency of *over-watering* should be avoided, especially in the case of potted plants. Evaporation and absorption do not take place to the same extent as on the plains ; therefore, plants in pots should not be watered more than once a day, and that in the evening. During the rainy season no artificial watering is needed ; while in the winter only just sufficient should be given to keep the plants alive.

The foregoing general directions for the cultivation of the Queen of Flowers on the Hills are certainly limited ; but the scope of this work does not admit of greater detail. Nevertheless, they will be found sufficient for all practical purposes.

Roses for Exhibition.—Flower shows are now common in most parts of India. About a decade back they were confined to one or two of our Presidency towns only. Roses, both in a growing state and in cut-blooms, now form a conspicuous feature of these functions, and a few directions as to the manner of getting them ready for such purposes appear to be necessary.

In the case of growing plants on the plains, a selection should be made during the rains, and they should be potted off and kept separately. Their growth should be studied and kept within bounds. They should be specially treated in the way of soil and watering, so as to produce plants healthy in appearance, with good foliage and well-developed blooms. They should not be pruned before the beginning, or even the middle, of November, and the young shoots pinched back. This will induce a bushy growth, and keep back the blooms till the time of the show, which on the plains is usually held about the second week in February. The blooming should be so regulated that the flowers will not open until about a day or two before the show. Care should be taken not to leave more than two flower-buds on each stem, all the rest being pinched off. By this procedure all the strength of the stem goes to the two remaining buds. Liquid manure should be liberally used in January and February. A few applications of a solution made of sulphate of iron (known in the bazaars under the name of *kassees*), will add to the brilliancy of the flowers. An ounce to a gallon of water is the proportion. Plants intended for exhibition purposes should be kept in a situation where the hot rays of the

mid-day sun will not beat on the blooms, especially a week or so before the show.

In the case of cut-blooms, the plants from which they are intended to be taken are best grown in the ground. It is, however, necessary to prepare the ground with suitable soil before planting. Budded or grafted plants of the previous February should be selected, and put down about the beginning of the rains. They will have made and ripened their wood by the time the pruning season comes round. Those who possess a good selection of Roses already planted out should, of course, utilise them for cut blooms, and should select the plants from which they intend to exhibit beforehand. These should be treated in the same way as the potted plants to secure first-class blooms.

In selecting varieties, those only should be chosen which possess good forms, such as the globular, cupped, and imbricate. Expanded flowers are not considered fit for exhibition purposes. Fragrance and 'substance' are also considered important recommendations. For instance, Maréchal Niel, Gloire de Dijon, La France, Captain Christie, Star of Waltham, Louis Van Houtte, Senateur Vaisse, Paul Neron, and Monte Christo, are excellent types of what exhibition Roses should be. The number of varieties to select from, however, is almost unlimited, but some discretion must be exercised in choosing those that are likely to bloom when they are wanted.

One of the most important considerations at floral exhibitions in England is that the plants and cut-blooms are *properly and correctly named.* A Rose without a name at an exhibition, no matter how beautiful and well cultivated, loses all its value as an exhibition plant. This point is not rigidly insisted upon in this country; but it should be, not only in the case of Roses, but of every other species of plant exhibited.

The pots or tubs in which exhibition plants are grown should be well made, uniform in size and shape, and, above all, clean.

For cut-blooms, the best thing to use is the exhibition box so common in England. The following is a description of it:—It is made of common deal wood on the principle of the ordinary writing desk. The length varies, if required, for 24, 18, 12, or 6 Roses, as the case may be; but the breadth and height, both at back and front, remain the same. Thus, for 24 Roses, the box should be 3 feet 9 inches long, 18 inches in breadth; height, 7 inches at back and 5 inches in front:—

	Length.	*Breadth.*	*Height.*	
For 18 Roses	2 ft. 9 in.	1 ft. 6 in.	Back 7 in.	Front 5 in.
„ 12 „	2 „ 0 „	„	„	„
„ 6 „	1 „ 3 „	„	„	„

The foregoing measurements are given by the Rev. S. Reynolds Hole, and are found to be the best for all practical purposes. The two woodcuts below (Figs. 35 and 36) are taken from his book on Roses, a liberty which, the writer hopes, the celebrated Rosarian will pardon.

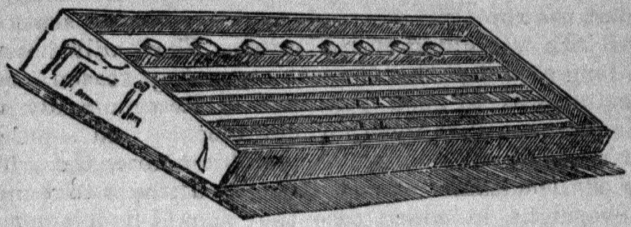

Fig. 35.

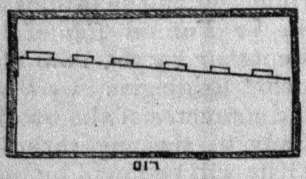

Fig. 36.

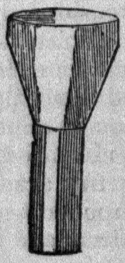

Fig. 37.

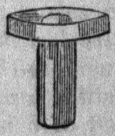

Fig. 38.

Fig. 35 represents the lower portion of the box, and Fig. 36 a vertical section. The cover is six inches in depth at the back and eight inches in front, being $1\frac{1}{2}$ inches longer and wider than the box, and having a narrow beading within the four sides, half an inch from the bottom of the lid, which overlaps the box, leaving ample room for the blooms. The covers are secured by stout leather straps for travelling. Within the box, strong laths, $\frac{3}{4} + 1\frac{7}{8}$ inch, extending the length of the box, and six in number, are nailed to strong pieces of wood, one at each end, two inches below the surface. The upper and lower laths should be $\frac{1}{8}$ of an inch within the box, and the remaining four so arranged as to leave three spaces $1\frac{1}{4}$ inch wide—three for placing the blooms in, and two for reducing weight. There will be a space of $1\frac{1}{4}$ inch between the laths and the upper edges of the box, which should be filled as follows:—Cover the laths with sheets of brown paper, two deep, and cut to fit the box, upon which place fresh moss. This, however, is not always procurable on the plains of India, and the writer has seen "Doob grass" freshly cut (especially by a lawn mower) used as a first-class substitute.

Ferns and other foliage might be arranged over this to heighten the effect.

The blooms themselves are first placed in zinc or tin tubes, as illustrated in Figs. 37 and 38. These tubes are 4½ inches long, and 2 inches wide at the top, tapering to one inch at the bottom. It will be observed that the top (Fig. 38) is moveable, so as to allow of the tube being filled with water without disturbing the bloom. Each Rose is cut with a long stem, is put into a tube filled with water, and having its name legibly written on a label attached to a stick, which is stuck into the moss or "Doob" beside the bloom.

The best time to cut-blooms for exhibitions is in the early morning on the day of the show. In some cases it will be found necessary to cut them overnight, in which case they should be left out in the dew —of course, first placing them in a tube filled with water.

A great deal of the success of a collection of cut-blooms depends upon their arrangement in the box according to colour and contrast. In this, individual taste and judgment must guide the exhibitor.

Descriptive Lists.—The reviser of the present edition of this work has not considered it either expedient or necessary to make any change in the classification and descriptive lists of Roses given by the author, as to do so would be to alter entirely the character of the book. There are now one or two works devoted entirely to the cultivation of Roses in India, in which very full descriptive lists will be found by those desirous of growing very large collections. Moreover, the catalogues issued by English and Continental Rose-growers—especially William Paul and Son, of Waltham Cross—are Rose Manuals in themselves.

It must, however, be confessed that the lists to be found in this work are very far from complete, for hundreds of very desirable and really lovely varieties have been added to our already extensive collection, for information regarding which readers are referred to the two or three works on Roses in India and to the catalogues mentioned above.

Groups.—Roses now in cultivation either belong to, or derive their origin from, two well-defined groups :

(1) The Roses of Europe and Western Asia, such as the old Cabbage, French, and Damask Roses, the general character of which is that they bloom only in June and July.

(2) The Roses of Eastern Asia, such as the China, Bengal, and Bourbon Roses, which bloom nearly throughout the whole year.

Now scarcely a Rose of the first of these groups has been found to succeed in this country ; while the Roses of the second group, as far as my observation goes, bloom far more beautifully in India than in England.

But from crossing and interbreeding the Roses of the two groups, cultivators have raised of late years an immense number of hybrids, and

for the guidance of those who wish to procure any of these hybrids from Europe, it may, I believe, be laid down as a rule that the more hybrid has of the blood (to speak familiarly) of the second group, the more likely it is to succeed in this country, and the more of the first group, the less likely. Roses, for instance, called Hybrid China and Hybrid Bourbon, producing flowers of great beauty, owe so much of their parentage to the first group that that they inherit from it the property of blooming only in summer, and none of these, be it observed, have been found to answer in this country. By crossing again, however, these hybrids, so as to throw into their progeny a greater affinity to some Rose of the second group, new hybrids are produced which possess this proporty, viz., that after blooming in June and July, from out the flowering shoots fresh, or as they are sometimes termed *secondary*, shoots break forth, which produce flowers in the autumn. Hybrids that possess this property are what are called by the French *Hybrides Remontants* and by the English Hybrid Perpetuals. The more, then, a Rose possesses of this property, the more we may conclude that it is suited to this country.

3. Of climbing Roses, notice will be taken further on.

Cultivators in England arrange Roses in two great divisions, according to the season in which they bloom. The Roses of the first division are called summer Roses, from blooming only in the summer; those of the second division Autumnal Roses, from their blooming in the autumn as well as in the summer. For convenience I adopt the same arrangement, observing that in this country the Autumnal Roses often put forth poor, small, semi-double flowers during the rains blossom in perfection in November or December, and again, but not so finely, in February. The Summer Roses blossom only in February or March.

DIVISION I.

Rosa centifolia.

PROVENCE ROSES.

This group contains the several varieties of Cabbage, including Moss Roses, of different sizes and shades of colour, from crimson to pure white. No Rose of this group, as far as I can ascertain, has ever been brought to establish itself and thrive in Lower Bengal, nor, as I believe, in the plains of India at all. Roxburgh in his 'Flora Indica,' has, it is true, specified R. centifolia, but it is R. damascena he intends, which he accounts only a variety of R. centifolia.

MOSS ROSE.—This Rose has been several times introduced, but never brought to thrive and establish itself. Even in the apparently more congenial climate of Ootacamund, I learnt that it had not been found to succeed. In the Punjab, I am told, it thrives very tolerably, and may be budded with great success, but that it is most reluctant to blossom; but I am led to suspect it is not the true old Moss they have there, but one of the many hybrids that have been raised from it. On the Hills, however, the several varieties of Moss Rose thrive and blossom freely.

Rosa Damascena.

DAMASK ROSES.

BUSSORA OR PERSIAN ROSE.—The Bussora Rose is distinguished for the rich perfume of its flowers, is common all over India, and in some places cultivated extensively for the manufacture of atar. There are two varieties, the red and the white, only partially double, very fugitive, blossoming for one brief season—in March. The stems are profusely covered with small fine spines, and the plant has rather a shabby, unsightly appearance. The usual practice is to head down all the stems in November, remove the earth, so that the roots be laid bare for a week or two, and then fill in the earth again with a liberal supply of old cow-manure.

The Bussora appears to be the form of R. damascena, such as we might almost expect to find it in its wild, uncultivated state. In this state, seemingly, it is alone capable of existing in India. For I know of no other form of the Damask Rose that has been established in India —not one certainly of the sweet and completely double varieties that in past years were so much the ornament of English gardens, as indeed of some few they even now are.

HYBRID PROVENCE: HYBRID CHINA: HYBRID BOURBON: ROSA ALBA: ROSA GALLICA: ROSA SPINOSISSIMA.

Of these several groups, hardly a Rose will be found to which the climate of India is adapted. Of the Hybrid Provence and Hybrid China groups, plants introduced by me existed in a very unthriving condition in my garden more than a year. Of Hybrid Bourbons, Charles Duval, Paul Perras, and Paul Ricaut have been introduced, and found to thrive vigorously, but produce no flowers. Of the remaining three groups, I am not aware that I have seen a single Rose in this country.

Rosa rubiginosa.

SWEET BRIAR—EGLANTINE.

Common in all parts of India; bears small pink, single flowers, does not bear the knife well, and will not blossom if pruned; can only be propagated by budding, grafting, or sowing the seed, but not by cuttings. It produces seed in the Agri-Horticultural Society's Gardens, which is gathered when quite ripe and sown immediately. It takes twelve or eighteen months to germinate.

Rosa lutea.

AUSTRIAN BRIAR.

The only Rose of this group I have seen in India was one which, when I resided at Ferozepore, I obtained from Peshawur, from cuttings conveyed in a letter, and nearly dried up by a five-days' journey in September. I removed several buds, which I inserted upon stems of the Rose Edouard. They nearly all took. It was a pretty variety, with sweet-scented leaves, and blossomed in March with a profusion of single, golden-yellow, rather evanescent flowers, but making for the time a most beautiful display.

PERSIAN YELLOW.—This is the only one of its group considered worthy of cultivation in England, bears deep golden-yellow, perfectly double flowers. It has been introduced into this country, but cannot be brought to thrive or blossom vigorously.

Rosa Banksæ.

BANKSIAN ROSES.

1. ROSA TERNATA.—A common plant about Calcutta; of rampant growth, with bright, glossy, dark-green foliage, contrasting prettily with its single pure white flowers.

2. WHITE BANKSIAN, from China, a plant with slender thornless twigs and long narrow leaves, is met with in the Calcutta Botanical Gardens, and bears in April bunches of very small, double, white, violet-scented flowers, but thrives very indifferently; will not bear pruning.

3. YELLOW BANKSIAN is also met with in Calcutta, but is rare.

FORTUNE'S YELLOW ROSE.

A rambling shrub with slender branches, of rapid and extensive growth, not to be confounded with the White Banksian Rosa Fortuniana; flowers described as large, double, with their petals loosely and irregularly arranged, of copper and fawn colour; introduced several years ago by Mr. Fortune, from China, into the Gardens of the Agri-Horticultural Society, but has never flowered, which possibly may be owing to its having been pruned. Messrs. Standish and Noble, the cultivators of it in England, say:—"The shoots should only be thinned; to shorten them is to destroy the flowers."*

Rosa multiflora.

A powerful scandent shrub; bears small pinkish flowers in February in crowded clusters; hardly worth a place in the garden, as plants take several years and become very large before they blossom, and do so then only sparingly. This, though very similar to the Rose bearing the same name in England, is quite distinct from it. Both kinds are found at Ootacamund, where they form hedges, and blossom most profusely. I brought down thence the English variety to Chinsurah, but it succeeded there no better than the common kind.

Rosa gigantea.

A climbing rose of rampant growth, very similar to the last; produces no flowers; used in Lower Bengal for stocks for inarching upon.

Rosa involucrata.

A bramble-like plant, with small, pale yellow-green, pretty foliage; bears in February a profusion of white flowers like those of the Dog-Rose; quite single.

DIVISION II.

DAMASK PERPETUAL.

LAURENCE DE MONTMORENCY.—A common Rose in the gardens about Calcutta, and certainly one of the most beautiful: plant of dwarf habit; flowers large, double, cup-formed, of delicate blush colour; should be pruned freely: easily propagated by cuttings.

* Paxton's 'Flower Garden,' vol. iii., p. 157.

HYBRID PERPETUAL.

In England, the Roses of this group stand in the very highest estimation for the fulness, colour, and fragrance of their flowers, and some, but by no means all, for the continuance of their blooming. In this country they seem, it is true, when once established, to thrive vigorously, but in many instances are very shy of blooming; some do not bloom at all, and some others that do produce very poor, unsatisfactory, flowers. This, no doubt, depends in a great measure on their lineage, as already explained.

In Europe, these Roses are subjected to a severe pruning after they have completed their season's growth. This is sometimes done before winter; but more commonly, I believe, in the spring, when all shoots the plants have made during the past season are cut back to a third, or even a quarter, of their length. This is equally essential in this country, and must by no means be omitted. It should be done about the middle of October. When in a healthy, vigorous condition, cuttings of nearly all of them laid down in November are not in the least difficult of propagation.

1. GÉANT DES BATAILLES—Is met with in several of the Calcutta gardens, but never in a very vigorous condition, nor bearing flowers to support the high reputation it once had in Europe. Far superior kinds of its class have quite supplanted it now. Mr. New, of the Government Gardens at Bangalore, pointed it out to me budded upon the Bussora Rose—much to its benefit, as he considered. It is not by any means difficult of propagation by cuttings.

2. LORD RAGLAN.—Said to surpass even the last in the beauty and dazzling brilliancy of its flowers, introduced by me; produced only poor valueless flowers.

3. LÉONE VERGER.—A small compact bush, bearing a profusion of small, beautiful, cherry-coloured flowers; a delightful plant, nearly constantly in bloom.

4. MARQUISA BOCCELLA.—A plant of small growth, remarkable for its very distinct and rich green foliage; flowers of moderate size, pale-pink, very double, and imbricated, produced in the hot and rain seasons: not very easy of propagation by cuttings.

5. CAROLINE DE SANSAL.—A beautiful pale rose-coloured flower, opening with its petals compact and crowded much in the manner of Souvenir de la Malmaison: established in this country, where it succeeds tolerably well.

6. GENERAL JACQUEMINOT.—A large, not very double, but most superbly brilliant Rose of a dazzling red: well established in this country, where it thrives and blossoms well, and is easily propagated; among the finest we now possess. It is so profuse in its blooming that

in England plants of it are cultivated by thousands for cut flowers for the market. Its bright colour, however, is rather fugitive.

7. PRINCESS ADELAIDE.—(Not to be confounded with the old Tea Rose, to which this name is alone given in the English lists.) Flowers deep blush, large globular, rather single when full-blown, but exceedingly beautiful when half open ; a long-established favourite ; blossoms well only upon plants three or four years old.

8. ENFANT DE MONT CARMEL.—Flowers of moderate size, of rich deep crimson, with small compact and crowded petals ; of a fine peculiar fragrance. Thrives, but not vigorously, here.

9. DUC DE NEMOURS.—An old Rose in the Agri-Horticultural Society's Garden ; flowers crimson, of large, full, globular form.

10. LA REINE.—An old Rose in the country, but still one of the most beautiful, producing large, deep rose-coloured, cup-formed flowers. Young plants do not blossom till two or three years old.

11. POPE PIUS IX.—A plant of vigorous growth, but very shy of blooming ; puts forth towards the close of the rains one or two of its rather very small double flowers.

12. MADAME MASSON.—A beautiful Rose, of moderate size ; flowers deep crimson, changing to violet ; thrives and blossoms well in the Agri-Horticultural Society's Garden.

13. BARONNE HALLEZ.—A beautiful dark-red Rose, now long in the country.

The above, together with Madame Laflay, Jules Margottin, Baronne Prevost, Souvenir de la Reine d'Angleterre, and a few others, have been long established in India ; but those that have been introduced since are so many that it would be vain for me to attempt to describe or even name them. Some years ago there was issued a notice of as many as seventy kinds, distributed by the Agri-Horticultural Society : out of these I find about twenty-eight, though once in high esteem, and good Roses withal, displaced in the English nurseryman's lists by others of superior merit. These lists are very extensive. It is well, however, not to be led away by them to a craving for too many, but to be satisfied with securing a few of the best. And hereupon I quote, as most deserving of consideration, what has been said by so eminent an authority as Mr. Rivers : "The New Hybrid Perpetual Roses annually sent out by the French florists make up a long list of names ; out of these, as a rule, but *very few* prove worthy of attention ; the greater portion are different shades of crimson—seedlings raised from General Jacqueminot—and fatiguing from their sameness of colour : among them all there is not one equal to Charles Lefebvre. Owing to this large annual introduction of quasi-new kinds, Rose catalogues have became burdened with an array of names tedious to read, and irksome to those who wish to select a few really good Roses."

I now give a list of the chief best kinds in cultivation, arranged according to their colours. I attempt no description, as, where all are beautiful, it were impossible to convey in few words any idea of the respective merits of each. Those who desire a more extensive list would do well to procure one from any of the principal Rose-growers in England.

White—Boule de Neige; Coquette des Blanches; Louise Darzens.

Blush—Baroness Rothschild; Madame Rivers; Madame Vidot; Reine Blanche; Thyra Hammerick.

Rose-coloured and Pink—Abel Grand; Charles Rouilard; Charles Verdier; Comtesse de Chabrillant; Josephine de Beauharnais; La France; Madame Guinnoiseau; Madame Thérèse Levet: Marguerite de St. Amand; Marguerite Dombrain; Monsieur Noman; Reine du Midi; Caroline de Sansal; Elie Morel; Emille Hausburg; Madame Caillat.

Carmine—Beauty of Waltham; Charles Margottin; John Hopper; Jules Margottin; Madame Alice Dureau: Madame Charles Crapelet; Madame Victor Verdier; Marie Raddy; Paul Neron; Prince Leon; Victor Verdier; Ville de Lyon; Edward Morren; Nardy Frères; Princess Louise.

Bright Crimson and Scarlet.—Alfred Colomb: Antonie Doucher; Baronne Adolphe de Rothschild; Charles Lefebvre; Dr. Andry; Duc de Rohan; Duke of Edinburgh; Fisher Holmes; François Lacharme; François Treyve; Camille Bernardin; Duchesse de Caylus; Exposition de Brie; Leopold Hausburgh; Marie Bauman.

Dark Crimson.—Duke of Wellington; Horace Vernet; Lord Clyde; Maréchal Vaillant; Pierre Notting; Prince Camille de Rohan; Xavier Olibo; François Louvat; Baronne Hausmann; Monte Christo.

ROSE DE ROSOMENE.

GLORIE DE ROSOMENE.—A plant of large growth and sprawling habit, not uncommon in Calcutta; produces all but single, large-petalled, brilliant crimson flowers, pleasing to those who care more for colour than for form: easily propagated by cuttings. Hedges are formed of this Rose in the Botanical Gardens at Ootacamund.

BOURBON ROSES.

1. ROSE EDOUARD.—Originally from the Isle of Bourbon, and parent of the whole group. An old well-known Rose in all parts of India, most desirable for the constancy of its bloom as well as for the sweetness of its flowers. During the cold season it produces flower-buds in unbounded profusion, which rot in the centre and never open. The stems, after blossoming, should be pruned closely. Exceedingly vigorous in

growth, and easily propagated, affording the best stocks we have for budding other kinds upon.*

2. PHEOLINA BORBONICA. — A common Rose in Calcutta; bears a strong resemblance to the last in every respect, but produces flowers somewhat smaller and perhaps a little sweeter.

3. ARMOSSA—JIBBON KISSEN PAUL'S ROSE.—Somewhat similar to Pheolina, but producing its flowers, which are rather smaller, more double, and of better form, in crowded clusters; produces a profusion of buds in the cold season, which never open.

4. QUEEN.—A lovely, fine-formed, flesh-coloured Rose; thrives well in Calcutta, where it is now quite established.

5. MRS. BOSANQUET (called formerly, in the Garden of the Agri-Horticultural Society, MAIDEN'S BLUSH, and known by native dealers as *Khura Peel*).—A plant of stout stems, but not large growth; flowers large, white, the petals overlapping with beautiful regularity, as in a Camellia; perfect in form, and one of the loveliest Roses we have: the plant does not bear much cutting in; not very readily propagated; but cuttings put down in November, in a shady place, will some of them strike. From its vigorous growth, and the much finer and fuller flowers it produces in this country, I was for some time unable to identify this rose. Following some, I have retained it among the Bourbons, though usually grouped among the China.

6. ACIDALIE.—A beautiful blush Rose; bears a strong resemblance to Mrs. Bosanquet, but has petals more uneven with a deeper tinge on their edges. Not a very thriving plant in this country.

7. PIERRE DE ST. CYR.—Pale pink of moderate size, very beautiful. Thrives well and blossoms most freely in this country.

8. PRINCE ALBERT.—Described as a superb Rose, is found in some of the Calcutta gardens.

9. MARQUIS DE BALBIANO.—A plant of moderate growth. Flowers of medium size, very double, of a dazzling fiery-crimson colour.

10. QUEEN OF THE REDS (so named in the Garden of the Agri-Horticultural Society, and certainly not, as supposed by some to be, the French Rose D'Aguesseau).—An old and common Rose in Calcutta garden; plant not of large growth; flowers bear the strongest possible resemblance to those of the last.

11. SIR JOSEPH PAXTON.—Introduced by me; proved a stout-growing plant with large handsome foliage, and produced fine deep, dazzling crimson flowers.

12. SOUVENIR DE LA MALMAISON.—A most superb Rose, particularly lovely in the bud, which is large, blush-coloured, and voluptuous.

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* For the history of this Rose see a paper sent by me to the Journal of the Agri-Hort., Soc., vol. iv., part ii., N.S.

Most of the Roses of this group may, I believe, be reckoned upon as likely to thrive and blossom well in India. The following are the principal ones now found in the murserymen's lists, arranged according to colour :—

White.—Barrone de Maynard, Emotion, Madame Gustave Bonnet, Mademoiselle Emain, Marguerite Bonnet. *Pink.*—Baron Gonella, Catherine Guillot, Comtesse Barbantanne, Empress Eugénie, L'Avenir, Louise Margottin, Madame Charles Baltet, Madame Maréchal, Michel Ronnet, Modéle de Perfection. *Rose*—Baronne Noirmont, Héroine Vaucluse, Madame de Stella. *Carmine.*—Jules César, Rev. H. Dombrain, Dr. Berthet, G. Peabody.

CHINA ROSES.

The Roses of this group are more dwarf and compact in their growth than those of most other groups. All that we have in India—and I believe if Clara Sylvain, pure white, and Fabvier, scarlet, be added we have all of any merit—thrive vigorously, are most easily propagated by cuttings, and, both as regards the profusion as well as beauty of the flowers they put forth, blossom in perfection.

1. ROSA CHINENSIS. 2. ROSA INDICA. 3. ROSA SEMPERFLORENS.—These three species, the parents of the group, bear valueless single flowers, and are altogether undeserving a place in the garden. The cultivated variety however, called the China Rose, is a cheerful plant from the numberless pink blossoms it puts forth, though the flowers are thin and poor in form.

4. EUGENE BEAUHARNAIS.—Flowers small but very lovely when little more than half-expanded, perfect in form, resembling bright amaranth-coloured double Anemones.

5. CRAMCISIE SUPÉRIEURE.—Flowers large, completely double, the petals like satin velvet, of brilliant crimson scarlet, unequalled in colour by any Rose we have.

6. ARCHDUKE CHARLES (known by the name of ROSA DISCOLOR in the Gardens of the Agri-Horticultural Society)—*Dor-ungee.*—A plant of stout habit ; flowers noble, of the largest size, very double, petals very beautifully overlapping, almost white on first opening, turning to a dark dull-crimson a day or two afterwards.

7. CHINA MELIOR.—Flowers of moderate size and irregular form, of a mottled dull red colour ; very uncertain.

8. DUC DE BERRI.—Somewhat like the last, but the flowers smaller, darker, and often disfigured by a decayed and black centre.

9. MADAME BRÉON.—Of a brilliant rich rosec olour, large and full.

10. UNIQUE.—An old Rose in the Botanical Gardens, probably a

seedling of this country ; a pretty free-blooming Rose of moderate size, with thick imbricated petals, of a dull mottled crimson.

11. LE CAMÉLÉON.—Flowers described as whitish-pink, changing to blackish-crimson.

12. LAWRENCEANA.—FAIRY QUEEN.—A diminutive plant ; flowers pink, of the form and size of a double daisy ; a variety also is met with, not uncommon, having flowers somewhat larger. This Rose makes no show in the border, and is best grown in a pot corresponding to its size.

TEA-SCENTED.

The Roses of this group, distinguished by their smaller growth, more delicate habit, and by the peculiar tea-scent of the flowers, are about the choicest and most lovely of all. They never, as the Hybrid Perpetuals often do, cause disappointment by producing no flowers, but, when well established and properly cultivated, are sure, in due time, of coming into bloom in great beauty. Indeed, those that we have in India seem to me to thrive more vigorously far, and blossom even more profusely and beautifully, than they do in England.

1. BOOTH'S ROSE.—A local name in Calcutta, supposed by some to be Goubault, but more probably Bougére, as delightful a Rose as we either have or could have in the country ; of strong vigorous growth, producing large exceedingly double deep blush flowers of delicious fragrance ; easily propagated by cuttings, and very common in the Calcutta gardens.

2. WOOD'S ROSE.—A local name, the true name unknown : very similar indeed to the last, both in foliage and flower, but the flowers are scentless. Called by some Marshal Bugeaud.

3. SOUVENIR D'UN AMI.—No Rose that I have seen in India can at all be compared for beauty of form with the large rose-coloured, drooping, half-expanded flower of this.

4. FRENCH WHITE.—Its local name in the Gardens of the Agri-Horticultural Society, but certainly not appropriate as regards the colour of its flowers : supposed by some to be "Maid of Athens :" a bush of considerable size and very abundant foliage, bears in great profusion prettily-formed fawn-white very fragrant flowers of moderate size : very common in Calcutta, and easily propagated by cuttings.

5 GLOIRE DE DIJON.—Accounted one of the very finest of the Tea-roses ; flowers large, expanded, very double, with orange-yellow centre, the central petals crowded and crumpled. The colour in different specimens varies much, ranging from palest yellow through reddish-orange up to pure red : an exceedingly strong-growing Rose, so much so as to be often trained to cover the side of a house : easily propagated.

6. **Devoniensis.**—Known commonly by the name of Victoria in gardens about Calcutta : one of the finest Roses in existence, producing fine large double creamy-white deliciously fragrant flowers, disfigured often by having a green bud in the centre ; of stout, vigorous habit ; needs frequently to have the old wood cut out, which otherwise would die down and become unsightly ; considered difficult to propagate. I have met with most success by putting down cuttings in the open ground beneath a low bush in the month of August—a season of the year when cuttings of other kinds seldom succeed.

7. JULIE MANSAIS.—A small plant with pale yellow-green leaves, of delicate habit, and difficult of propagation ; produces small pale lemon-coloured flowers, exquisitely beautiful when only half expanded.

8. ABRICOTÉ.—Bears moderate-sized flowers with apricot-coloured centre.

9. SAFRANO.—Called at Octacamund, where it is exceedingly common, the Copper Rose, from the young stems as well as the dark-green leaves having much of a coppery tint ; produces deep fawn-coloured flowers, beautiful only in the bud.

10. COMTE DE PARIS.—Bears large flesh-coloured flowers.

11. ELISE SAUVAGE.—Long known about Calcutta under the name of "Odorata ;" produces large globular pendulous flowers, creamy white outside and of a rich apricot-yellow within, without fragrance ; one of the most lovely Roses known ; though not able to bear severe pruning, it is apt to become crowded with a quantity of short spur-like wood, which it will be necessary to thin out ; requires well manuring, and in the hot season frequent watering, or it will not thrive and blossom at all satisfactorily. Though many years in the country, it is a difficult Rose to obtain at Calcutta, except at a very high price. I have, however, found no difficulty in propagating it plentifully, more particularly as cuttings put down in the rains under any low bush will strike readily, as they will do also in the cold season ; but in the latter case they require frequent watering.

12. LA SYLPHIDE.—A beautiful Rose, of moderate size, much like Abricoté in colour ; thrives well here.

13. LA BOULE D'OR.—Flowers small, of a beautiful golden colour : the plant loves a dry soil.

14. SOUVENIR DE DAVID.—Flowers described as cherry colour, very large and double.

15. VICOMTESSE DE CAZES.—Flowers orange-yellow, large and very double ; one of the most beautiful.

16. GREEN TEA.—A dwarf Rose, common for many years in Calcutta, with dark glaucous foliage ; produces beautiful, small, globular, pure-white, scentless flowers ; and buds in the cold season, which do not open.

Beside the above, the following, arranged according to their colours, comprise nearly all now in cultivation in England :—

White.—Devoniensis, Climbing Devoniensis, Madame Willermoz, Madame Bravy, Marquise de Foucault, Niphetos ; Rubens ; Souvenir de Mademoiselle Pernet ; Triomphe de Guillot ; Zelia Pradel.

Yellow.—Adrienne Christophle ; Belle Lyonnaise ; Bouton d'or ; Coquette de Lyon ; Comtesse de Brossard ; Enfant de Lyon ; Isabella Sprunt ; Jaune d'or ; Jean Pernet ; La Boule d'or ; Lays ; L'enfant trouve ; Louise de Savoy ; Madame Cecile Berthod ; Madame Falcot ; Madame Levet ; Madame Margottin ; Madame Maurin ; Mademoiselle Adele Jougant ; Monsieur Furtado ; Narcisse ; Pactolus ; Reine de Portugal ; Vicomtesse de Cazes.

Fawn and Salmon.—Archimède ; August Oger ; Bougère ; Duc de Magenta ; Madame Damaisin ; Madame St. Joseph ; Monplaisir ; Pauline Labonté ; Triomphe de Luxemburg.

Flesh and Blush.—Adam ; Catherine Mermet ; Eugéne Desgaches ; Maréchal Bugeaud ; Moiré ; Sombreuil.

Rose.—Comtesse Ouvaroff ; General Tartas ; Homer ; Madame de Vatry ; President.

NOISETTE.

The original of this group is stated to have been a cross between the musk-rose and the common China, raised by the gardener whose name, it bears. The varieties bespeak plainly enough their origin in the crowded trusses of small, very double flowers they produce ; and some, Aimée Vibert, for example, in their distinct musk-like odour. Some are all but scentless. They are almost always in blossom, but in the height of their beauty perhaps in February.

1. BRIDESMAID. 2. LADY BULLER. 3. SIR WALTER SCOTT. 4. FELLENBERG. 5. RED NOISETTE.—These four last throw up numerous shoots in the form of large rampant rods, which if closely cut in, in October, will produce in February a great profusion of small red flowers ; all easy of propagation by cuttings, and common in Calcutta.

6. WHITE NOISETTE.—A small bush ; throws up continually new shoots, which produce great densely-crowded heads of small white faintly-fragrant flowers, forming one entire mass of white blossom ; requires close pruning : branches which have flowered should be immediately cut in ; a very common Rose here ; propagated easily from cuttings ; plants need often to be renewed.

7. CAROLINE MARNIESSE.—A plant of straggling habit, produces clusters of small pure-white flowers, with the crowded petals lapping completely over, somewhat resembling little Ranunculuses ; propagated easily by cuttings laid down under shade of a low bush in November.

8. AIMEE VIBERT.—A beautiful white Rose; well adorned with fine rich verdant foliage.

The following comprise those which might be reckoned upon as certain of succeeding well:—

White.—Jeanne d'Arc; Marie Accary; Maria Massot.

Cream.—La Biche.

Yellow.—Bouquet d'or; Celine Forestier; Claudia Augustin; Earl of Eldon; Guiletta; Jane Hardy; Lamarque Jaune; Madame Caroline Kuster; Margarita; Rève d'or.

Red.—Du Luxemburg.

TEA-SCENTED NOISETTE.

The Roses of this group are usually combined with those of the last. They are however in many respects very distinct. This is at once discerned in the extended growth of their stems, their very much larger flowers, their Tea-like scent, and the smaller number of them borne in the truss. They are magnificent Roses, and, as from their origin might be concluded, well suited to the climate of India, as witnessed in the long established favourite Solfaterre.

1. SOLFATERRE.—Very common in the gardens about Calcutta; a plant of very extensive growth, requiring a stout bamboo trellis for its support; produces large handsome pale lemon flowers, of strong Tea-fragrance, at nearly all times of the year. The young stems, when mature, should be cut back a couple of feet, and the side-shoots, which then break forth, will produce flowers. Apt to become crowded with small barren wood in the centre, which should be cut clean out; requires plenty of water in the dry season; propagated usually by layers, but cuttings also will strike freely. Mr. Errington does not consider this the true Solfaterre, of which plants have lately been received from England, but an inferior Rose. To me the difference is imperceptible.

2. RAJAH—(LAMARQUE?)—A splendid Rose, in every respect similar to the last, except that the flowers are somewhat paler, and perhaps rather larger.

3. JAUNE DESPREZ.—Flowers varying between buff and red, fragrant; thrives and blossoms abundantly here, but the shoots are given to die back.

4. (CANINA BORBONICA).—One of the most beautiful, though one of the commonest and oldest Roses in Calcutta; produces in greatest profusion large, handsome, pendulous, very double, though not well-formed, creamy-white flowers, with apricot centre, relieved most agreeably by the very peculiar and distinct yellow-green of the foliage; benefited by liberal pruning; considered difficult to propagate by cuttings. What the proper name of this Rose is I am at a loss to say. I

conceived it might be Triomphe de Bolwyller. Canina Borbonica (misprinted evidently for Chinensis Borboniana) was the name originally bestowed by Redouté on Rose Edouard. How in Calcutta the name became transferred to this Rose it is now impossible to tell.

5. MARÉCHAL NEIL.—This noble yellow Rose has now become thoroughly established throughout India, and is one of the finest acquisitions to the garden made of late. It is most vigorous in its growth, but in England it is considered to do best worked on the Gloire de Dijon as a stock.

Yellow.—Cloth of Gold; Isabella Gray; Mademoiselle Aristide; Triomphe de Rennes.

Coppery.—Ophirie; of brilllant foliage; flowers untidy, but borne in great profusion.

MUSK-ROSES.

Rosa moschata.—*Sêotee.*—Botanists seem to have decided that, if not actually identical with, this is only a variety of Rosa Brunonii, a wild Rose of the Indian hills Professor Koch says they are alike but for the hairiness of the latter. As found in the gardens of India, the Musk-rose is in general a dwarf plant, but its ordinary height elsewhere is stated to be six or seven feet. It is said that in Persia, trees of it have been seen as much as thirty feet high. It produces small flowers, with narrow, ill-formed, dirty white petals, and in the present day possesses little interest as a garden plant, except for its peculiar, though not very strong fragrance, which, as its name denotes, is thought to resemble that of musk.

Rosa Lyellii.

ROSE OF THE DOON.

Koozea.

A plant of extensive growth, common in the Upper Provinces, but not met with, that I am aware of, near Calcutta; bears large handsome double-blush flowers.

Rosa microphylla.

A native of the hills of India; forms a large compact bush, with dense, very pretty, small-leaved foliage; flowers double; well-formed, blush, with carmine centre, quite scentless; much adorned by the large green, prickly calyx that surrounds them.

CLIMBING ROSES.

Very few of the Roses belonging to either of the Boursault, Ayrshire, or Evergreen groups, which as climbing Roses, for their bright foliage and rich profusion of flowers, form in summer so conspicuous an ornament of the English garden, have, if ever introduced, been able to maintain a footing in India. It is upon the whole to the Tea-scented Noisettes that the gardens of Bengal at least must be indebted for their climbing Roses. The training, however, and pruning I prescribe, is applicable, I believe, for climbing Roses indiscriminately. But it must be borne in mind that this does not apply to those of the Hybrid Perpetual Roses that are sometimes trained to a great height, as Pillar Roses. They are none the more climbing Roses for being so trained. The property of all true climbing Roses is to send forth stems of great length, towards the ends of which shoots are omitted, which bear the flowers. If, then, these stems are much shortened, the lower portions of them which remain emit shoots, but these shoots bear no flowers. The mode of proceeding with them will then be as follows:

1. Insert bamboo stakes in a circle round the plant. Cut out clean away to the ground all but three or four of the aforesaid long stems, train these three or four stems from stake to stake in a spiral form, and allow them to grow to their fullest length.

2. Cut out all sprays and small wood at the bottom of these stems, so as to keep them clear of wood a foot or two from the ground. This will render the plant accessible for applying surface-dressings, which are of the utmost benefit.

3. When the stems become old, and show signs of debility, cut them out, and train new ones in their place.

4. The only pruning required, if any, will be just to take off about six inches from the end of the stem, this will give greater strength to the flower shoots just below.

Rubus.

R. rosæfolius.—A small pretty plant with bramble-like foliage, native of the Mauritius; flowers resemble small, very compact, double pure-white scentless Roses; very common in the Calcutta gardens, and very troublesome for the numerous suckers it throws up to a wide distance around.

Potentilla.

Plants of the several kinds of Potentilla may be raised from seed in October, and kept with no great difficulty through the following hot season; but the poor flowers they produce, if they blossom at all, are hardly worth taking the trouble for.

Geum.

G. atrosanguineum.—Bears large blood-red strawberry-blossom-like flowers; but though raised easily from seed and kept from one cold season to another, in the vicinity of Calcutta seldom or never blossoms.

Kerria.

K. Japonica.—A twiggy description of shrub, usually grown nailed to walls in England, but never rising to more than a foot or so high here. Flowers in the form of a ball, of moderate size, very double, and bright yellow; not a very ornamental plant anywhere, and far from being so in this climate, where it thrives but indifferently.

Spiræa.

This genus contains the old familiar Meadow-Sweet of our English fields, besides several beautiful cultivated species. We have but two in this country, and these, I believe, by no means among the most ornamental.

1. **S. corymbosa.**—Native of China; a small shrub of slender twiggy growth, about two feet high; very pretty, when in full blossom in the hot season, with its small white flowers, borne in crowded compact heads on the ends of the twigs. The great detraction from the beauty of the plant is the bareness of leaves on the stems, except at their extremities.

2. **S. nutans.**—In general character very similar to the preceding; but with somewhat smaller and differently formed leaves; bears also similar flowers, but is rather shy of blooming. Propagated by cuttings in the rains.

SAXIFRAGACEÆ.

Saxifraga.

1. **S. sarmentosa.**—A pretty herbaceous plant, with small round leaves, variegated above, and of a dark-red colour on their under surface; usually grown in England in pots suspended from the window-frame, whence it lets drop its delicate, thread-like, red runners in such profusion as almost to give the appearance of matted hair. Plants have been introduced into this country from China by Mr. Fortune, but they do not seem to thrive here, nor manifest any tendency to send out the runners, which constitute the principal feature of their beauty.

2. **S. sp.**—An unnamed herbaceous plant in the Calcutta Botanical Gardens, bearing a strong resemblance to S. crassifoli of the cottage-gardens in England, having large, fleshy leaves, and bearing heads of small rose-coloured flowers; of not much beauty.

HYDRANGEACEÆ.

Hydrangea.

1. **H. mutabilis.**—This plant, which in the Channel Islands becomes a large, noble, bushy shrub, six or eight feet in height, is not uncommon in Calcutta, but is grown in a pot, and never attains to more than a foot and a half high, nor bears those magnificent trusses of bloom which render it so conspicuous an object of beauty in Europe.

On the hills this plant thrives to great perfection, and blooms in profusion. It is at its best during the rainy season, when it attains its greatest size. Needs very little care or attention. It is by nature a marsh plant, and requires abundance of water, particularly at the period of its most vigorous growth in March and April, and is best placed in a pan of water. It requires a light soil, and to be kept in the shade. Sir J. Paxton says that "much of the success in the culture of the plants depends upon their being placed in a southern aspect before flowering, to ripen their wood and buds." The great difficulty, however, here is to induce them to make wood. Flowers in April and May. Propagated easily by division.

2. **H. Japonica.**—This plant differs from the last in the leaves being of a longer, more pointed form, and of a more verdant, fresher green. The central flowers also of each truss of blossom are fertile, while those of the last are all barren. The habit of the two species is precisely the same, as well as the mode of cultivation.

3. **H. Japonica, variegata.**—An exceedingly beautiful plant, with large cream-coloured leaves blotched with green. I brought down plants of this from Ootacamund for the Calcutta Botanical Gardens, as well as for my own, but they all perished in the hot season, seemingly incapable of surviving the heat of the plains.

LYTHRACEÆ.

Heimia.

H. myrtifolia.—A small, low, slender, unpretending shrub; bears in May numerous small, yellow, uninteresting flowers. Scarcely worthy of a place in the garden.

Cuphea.

C. platycentra.—A scanty, mean-looking shrub three feet high, with small ovate leaves; flowers small, irregular-shaped, pale dull-red, with two purple-black, heart-shaped, erect lappets.

Ginoria.

G. Americana.—A rather pretty shrub, three or four feet high, with small myrtle-like leaves; bears during the hot and rain seasons pretty moderate-sized purple flowers, succeeded in the cold weather by small, shining, dark-purple berries. Propagated by seed and cuttings during the rains.

Grislea.

G. tomentosa.—*Dhâree—Dhâo.*—A large shrub, or rather small tree, eight or ten feet high, with drooping branches, and rather coarse-looking foliage, but very handsome when in full blossom in February and March, presenting the appearance of a perfect shower of dazzling red, with its infinitude of small, tubular, scarlet flowers. Propagated by cuttings in October.

Lawsonia.

L. alba.—HENNA—*Menhdee.*—A large shrub, sometimes growing to seven or eight feet high, with small neat foliage, much resembling that of a Myrtle; bears at the beginning and end of the cold season numerous large compact panicles of small greenish-white flowers, which scent the garden with a delightful fragrance. A plant of considerable notoriety for the red dye which the leaves afford to the women of the East for staining their finger and toe-nails. Propagated easily from seed or cuttings during the rains.

Lafoensia.

L. Vandelliana.—A small tree with foliage of a very neat and ornamental character; leaves oval, smooth, rigid, and shining, two and a half inches long; rather showy when in December it produces its abundance of large lagerströmia-like golden-yellow blossoms, with numerous long stamens projecting from them. Propagated by seed and cuttings in the rains.

Lagerstromia.

1. **L. Indica.**—An erect-growing shrub, three or four feet high, with smooth oval leaves, two-thirds of an inch long; bears in the rains, in

unbounded profusion, large panicles of rather small, fringe-petalled, rose-coloured flowers. There is a variety likewise with the flowers pure white, and one with them of a lilac colour. The three varieties grown together in a group, when in full blossom, form a most lovely ornament to the garden. In the cold season it is entirely leafless, when it should be well pruned in. Easily propagated either from seed or cuttings in the rains.

2. **L. elegans.**—A large strong-growing shrub with large handsome leaves and flowers, about ten times as large as those of the preceding; a magnificent object when in full flower, with its great compact panicles of light-purple blossom, telling finely upon its dark rich foliage.

3. **L. reginæ**—*Jârul.*—A tree of considerable size, yielding blossoms somewhat similar to those of the last, but much inferior. Major Drury says of it :—"This is without exception, when in blossom, one of the most showy trees of the Indian forests. It is now commonly cultivated in gardens on the western coast, where the moist damp climate is most suitable for its growth and the full development of the rich rose-coloured blossoms. In forests near the banks of rivers it grows to an enormous size, some having purple flowers, and forming a most beautiful and striking appearance." Propagated by seed sown in February.

CELASTRACEÆ.

Euonymus.

1. **Eu. garcinifolia.**—A small shrub, remarkably bright and sparkling when in full blossom in May and December. Flowers small, numerous, of a brilliant blood-colour. This is the only species of any interest; all others bear pale-green, inconspicuous, unattractive flowers. Propagated by cuttings in the rains.

2. **Eu. variegata.**—A shrub about three feet high, introduced by Mr. Fortune from China into the Gardens of the Agri-Horticultural Society, where it seems to thrive but indifferently, and owing to its unhealthy condition, perhaps is not very ornamental. In a climate that suited it, its round, rigid, smooth, glossy, variegated leaves would no doubt render it a very handsome object.

Chrysophyllum.

C. Cainito.—A fruit-tree of considerable size, but grown occasionally as an ornamental shrub. The golden hue of the under surface of its large laurel-like leaves contrasts very beautifully with the dark

rich, glossy green of their upper surface, especially when set in motion by the wind.

Sideroxylon,

S. inerme.—A small shrub of handsome foliage, in general aspect very similar to a Pittosporum.

Mimusops.

M. Elengi.—*Bâkul—Mâlsuree.*—A large timber-tree, much cultivated in the gardens of the natives for its beauty, as well as for the delightful fragrance diffused by the numberless small pale-green flowers it bears in March. At the gardens of the Taj at Agra, several handsome trees may be seen, and also in the enclosed gardens at the palace of Deeg. Propagated by seed during the rains.

AQUIFOLIACEÆ.

Ilex.

1. **I. Aquifolium.**—THE COMMON HOLLY.—Neither this nor any other species of Holly seems to succeed at all satisfactorily in the climate of this country, as most that have been introduced have survived only a few seasons. The Acanthus ilicifolius, however, bears so strong a resemblance to the Common Holly that many have, no doubt, mistaken the one for the other. On the hills, however, one or two varieties are indigenous.

2. **I. Paraguayensis.**—MATE—PARAGUAY TEA.—A specimen of this famous plant is to be met with in the Gardens of the Agri-Horticultural Society, where it is kept merely as an object of curiosity; it is of no interest whatever in an ornamental point of view. The idea of cultivating it in this climate for any use to which it could be applied would be quite futile.

APOCYNACEÆ.

Allamanda.

A genus of flowering shrubs of extreme beauty, mostly natives of Brazil, ornamental likewise for their foliage, with the leaves borne in a succession of whorls along the stem. Several species have been introduced into the gardens about Calcutta, where they thrive admirably, but there seems some uncertainty with regard to the accuracy of the

names given them. They are exceedingly easy of propagation by cuttings and layers. It is stated that some of the species have been introduced into England by means of seed. In the locality of Calcutta I have never become cognisant of an Allamanda producing seed.

1. **A. cathartica.**—A rather large shrub of scandent and rambling habit; a superb plant, one of the commonest of the Calcutta gardens; as well as one of the choicest ornaments of the stoves in England; flowers very large, pure bright yellow, finely relieved by the rich deep-green foliage; unexpanded flower-beds of a bright pure, yellow-green; in constant blossom during the hot and rain seasons; should be well cut in during the cold season to keep it within bounds.

2. **A. Schottii.**—The plant so named in the Calcutta Botanical Gardens differs in no discernible way from the foregoing. But the plant pointed out to me in the public gardens of Bangalore with this name assigned to it, and which I have since met with in the garden of Baboo Jibbon Kissen Paul of Hooghly, was a dwarf shrub, not scandent, with flowers, not more than a quarter of the size of the foregoing, with the outer part of the tube of the corolla deeply marked with red, and the unexpected flower-buds of a dark, dull chocolate red; quite different, however, from that described and figured in Curtis under the name.

3. **A. sp. from Kew.**—A plant so designated in the Calcutta Botanical Gardens, not to be distinguished from A. cathartica.

4. **A. nereifolia.**—Described in Curtis as "extremely different in habit from any described species, as well as in form of corolla, which is almost of a golden colour streaked with orange; panicles, with many flowers." A plant is stated to bave been exhibited at the Calcutta Flower-show of 1857 from the garden of Mr. F. Pareira.

5. **A. sp. from Java.**—A plant introduced within the last few years into the Calcutta Botanical Gardens; produces truly magnificent flowers, when fully expanded as much as five inches across, pure bright yellow, with the throat coloured with faint streaks of chocolate; the large unexpanded flower-buds of a deep chocolate colour.

6. **A. violacea; Nobilis; Hendersonii; Grandiflora,** and **Chelsoni** are also recent introductions into this country, and well worthy of cultivation.

Melodinus.

M. monogynus.—An extensively climbing shrub, with ornamental, bright, dark-green, lanceolate leaves; flowers not large, star-formed, like those of a Jasmine, pure-white and very fragrant; bears a fruit of the size and form of a moderate-sized apple, said to be eatable and agreeable. Propagated by seed and cuttings during the rains.

Rauwolfia.

R. canescens.—A small erect shrub about two feet high; bears small, insignificant, whitish flowers, not at all ornamental except for the small pea-sized berries it is always bearing of different colours, according to their state of ripeness, green, bright-red, and black. Propagated by seed in the rains.

Ophioxylon.

O. serpentinum.—A very common small shrub, about two feet high, producing its foliage in crowded whorls on the snmmit of the stems; leaves narrow, lanceolate, smooth, shining-green, about five inches long; bears nearly always its compact small corymbs of numerous small pure-white flowers, on delicate coral-red footstalks. Sir W. Jones says of it:—"Few shrubs in the world are more elegant, espeally when the vivid carmine of the perianth is contrasted not only with the milk-white corolla, but with the rich green berries which at the same time embellish the fascicles." This, perhaps, is higher praise than most would be willing to accord it. Easily propagated by division or by seed.

Thevetia.

T. nereifolia.—*Zurd Kunêl.*—So called from the great resemblance its foliage bears to that of the Oleander: a handsome small spreading tree, from eight to ten feet high; native of South America; constantly in blossom with numerous large, thimble-formed, bright-yellow flowers; bears in abundance large almond-like nuts, from which it is easily propagated.

Cerbera.

C. fruticosa.—A large spreading shrub, bearing large, handsome lanceolate leaves, from among which nearly at all seasons the rose-coloured flowers, much resembling those of Vinca rosea, peep forth and sparkle very prettily. Propagated by cuttings.

Tabernæmontana.

1. **T. coronaria.**—Called *Chândnee,* "Moonbeam," by the natives common in nearly all the gardens of India, and certainly as handsome a shrub as they could contain; from four to six feet high, with lanceolate, sharp-pointed, smooth, shining leaves, five or six inches long. Flowers large, double, pure enamel-white, borne almost constantly, and having a delightful appearance as they peer forth from the fine dark-

leaved foliage. In the night-time, it is said, they emit a delicate fragrance; in the day they are quite scentless. Propagated easily by layers or cuttings.

2. **T. dichotoma.**—A large handsome spreading shrub, occupying a great deal of room, with noble, broadly-lanceolate, rigid, yellow-green leaves, nine or ten inches long; bearing, scattered here and there, pure-white fragrant flowers, very similar to those of Vinca alba. Eve's Apple, or Forbidden Fruit of Paradise, is the name given to the fruit of this shrub, from the resemblance it bears in size and form to a half-nipped or half-eaten small Apple, as well as from its being a native of Ceylon, where Paradise is supposed by some to have been situated. The fruit, delicious once, became, it is told, a deadly poison after having been tasted by Eve. Propagated by cuttings.

3. **T. recurva.**—An exceedingly handsome and ornamental small spreading shrub, with narrow, lanceolate, pointed, very wavy, polished, deep-green leaves, three to four inches long; bears during the hot season a profusion of sparkling white flowers two-and-a-half inches across, the corolla consisting of five large flat lobes. Propagated by cuttings.

4. **T. densiflora.**—A small unpretending shrub, with the leaves borne in a crowded manner on the summit of the stem; bears in the Rains compact corymbs of very small white flowers; in no way ornamental. Propagated by cutting.

5. **T. citrifolia**; 6. **T. amygdalifolia**; 7. **T. Wallichiana.**—These last three have nothing whatever to recommend them in an ornamental point of view.

Vinca.

PERIWINKLE—GRAVE-YARD FLOWER.

1. **V. alba.**—A beautiful, though a very common, herbaceous plant, two feet high, with rich polished green, smooth, oval, leaves, affording a fine foil to the vivid white, large, round flowers, which it continues to produce at all seasons. Raised from seed or by cuttings.

2. **V. rosea.**—MADAGASCAR PERIWINKLE—OLD MAID.—In all respects like the preceding, except that the flowers are of a rose colour, and the stems stained with red. When in full blossom, as it nearly always is, a lovely plant. Raised from seed, which it bears abundantly. This and the preceding are grafted sometimes the one upon the other, it is said, with pretty effect.

3. **V. major**—COMMON PERIWINKLE.—The familiar plant of the gardens and hedgerows in England; bears in March and February its pretty blue flowers, of the same size as those of the preceding. Occasionally met with, but by no means a common plant.

Plumieria.

1. **P. acuminata**—SPANISH JASMINE—*Gooi-i-cheen.*—A small tree, ten to twelve feet high; not ill-looking when in full foliage, with its large, lanceolate, smooth leaves, nine inches long and two and a half wide, borne crowdedly, towards the summits of the stems, but remarkably uncouth when the succulent, gouty-looking stems are destitute of leaves, as they often are in the cold months; bears during the hot and rain seasons, at the ends of the stems, large corymbs of large, pure-white, exquisitely fragrant flowers, with the interior of their cup yellow. Propagated easily by cuttings. In the cold season it occasionally yields a pair of seed-pods or two, but very seldom. In some gardens is met with a very pretty and interesting variety of this shrub, the unexpanded flower-buds of which are of a deep dull crimson colour. The flower when fully expanded has one-half of the under-side of its petals dull crimson, and the other half white. The borders of the petals curl upwards, and are beautifully edged with crimson. The inferior of the flower is perhaps of a deeper yellow than the white variety.

2. **P. alba.**—Very similar to the preceding, except in being of more shrubby growth, with much denser and darker-coloured foliage. Flowers entirely white, with rounded expanding petals, and deliciously fragrant. Propagated by cuttings.

Parsonsia.

P. corymbosa.—A very ornamental scandent shrub, about four feet high, with slender stems requiring the support of a trellis, and with rich dark-green foliage of oval, smooth, rigid leaves, one to two inches long; bears during all the Hot season beautiful closely-crowded corymbs of very small bright-crimson flowers. Propagated by layers.

Beaumontia.

B. grandiflora.—A truly magnificent climbing shrub, with strong woody stems; spreads over an immense space its dense foliage curtain of noble, verdant, oval leaves, nine inches in length and four broad. Flowers trumpet-formed, resembling white Lilies, four inches long and three inches across, corolla expanding at the mouth with five roundish lobes, with a faint Lily-like scent, borne in a large corymb, and covering the plant with an entire mass of blossom from January to March. Of very rapid growth; a small plant in less than two years will ascend to the height of a lofty tree, or trained upon bamboo poles, to the summit of the highest house, attaching itself firmly to anything it approaches with its powerful rope-like tendrils. Propagated by cuttings or from seed.

Wrightia.

1. **W. antidysenterica.**—A small tree, with smooth obovate leaves: bears in the hot season corymbs of pure-white sweet-scented flowers. Propagated by cuttings in the rains.

2. **W. Coccinea.**—A small tree with smooth oval leaves, sharp-pointed, four or five inches long; very ornamental in the hot months, when bearing its corymbs of numerous flat, regular, five-lobed flowers, two inches across, of the colour and texture of scarlet velvet; presents also a curious appearance in the cold season, with its large, long, cylindrical seed-vessels suspended among the stems. Propagated by seed sown in February, or cuttings in the rains.

Alstonia.

A nereifolia.—A small shrub, with neat foliage, much resembling that of the Oleander, but with leaves somewhat broader; flowers of moderate size, star-like, pure-white, scentless, though unpretending in themselves, yet cheerful-looking opposed to the dark-green leaves. May be raised from seed.

A macrophylla is a large leaved variety of the above.

Nerium.

N. odorum.—OLEANDER—ROSE-BAY—*Kunêl.*—A large spreading shrub six to eight feet high; throws up from the ground its numerous rod-like stems, upon the summit of which is borne its foliage of narrow lanceolate leaves, surmounted by a profusion of large cheerful flowers. There are several varieties of this delightful shrub, namely, those with pink, deep-red, white, and variegated flowers, both single and double of each. The double white, however, is a great rarity, though it is said to exist. This shrub may be considered the glory of the gardens of Upper India, where, during the hot season, it thrives vigorously, and being always covered with blossom, scents the whole air around with its fine perfume. In the vicinity of Calcutta it thrives not nearly so vigorously. In the Deccan it may be often seen growing wild by the margins of rivers and jheels, where it looks extremely beautiful. The juice of the stem is said to be a deadly poison. Propagated easily by cuttings, layers or by division. It also yields seed abundantly.

Rhyncospermum.

R. jasminoides.—A native of China but naturalized in this country. A slender climbing shrub, growing to about six or eight feet

high, with oval, pointed, deep-green, smooth leaves, about an inch and a half long; bears in the hot season, in unbounded profusion, pure-white, sparkling, delightfully fragrant, salver-shaped flowers, nearly an inch across, with the lobes of the corolla curiously twisted; produced in corymbs. A most choice and ornamental plant; requires a trellis for its support. Propagated easily in the rains by cuttings or layers.

Echites.

1. **E. caryophyllata**—CLOVE-SCENTED ECHITES—*Malutee*—A very extensively climbing shrub, with bay-like leaves; fastens itself upon, and runs up trees to a considerable height, and during the rains spreads out quite a curtain with the numberless sprays of its fragrant blossoms. Flowers white, of middle size, star-formed, with the petals twisted and irregular. Produces seed in the cold season. Propagated by layers and seed.

2. **E. l. lisianthiflora.**—A shrub of erect growth, about five feet high, in full blossom all the hot season, presenting at that time a very agreeable appearance with its profusion of rather large, pure white flowers. Propagated by layers.

3. **E. picta.**—A small, slender, climbing shrub, cultivated only for its ornamental foliage, as here, I believe, it never flowers; leaves narrow, about four inches long, of a very dark green, prettily marked with the white and conspicuous midrib. Propagated by layers.

4. **E. cymosa**—A small scandent shrub, ornamental for its leaves, which are lanceolate, three or four inches long, of a bright glossy green, often prettily marbled with the dark markings of the veins. Propagated by layers.

Pentalinon.

P. suberectum—SAVANNA-FLOWER—DEADLY-POISON-PLANT.—Native of Jamaica. A large climbing shrub with yellowish-green, verdant, oval leaves, two inches long: requires a stout high post or bamboo trellis for its support; in constant blossom during the hot season with large yellow, showy flowers, very much like those of Allamanda. Sir J. Paxton says that in its native locality, "whilst other vegetation is perishing from drought, this preserves the beautiful verdure of its leaves, and even continues to flower with the greatest vigour." Propagated by layers laid down in March or April.

Mandevilla.

M. suaveolens—CHILLI JASMINE.—A slender-stemmed extensively climbing shrub; bears large, pure-white flowers, as much as three inches

across, with five twisted lobes, delightfully fragrant. This plant is easily raised from seed, but is difficult to preserve any time in the plains, generally dying off before having flowered. "Blooms towards the ends of the shoots, which, therefore, should not be topped in growing time." Propagated by layers in the rains.

Dipladenia.

A genus of extremely handsome climbers and scandent shrubs, natives of Central America. When first introduced into this country they were found not to succeed, owing to the want of proper conditions, which have, however, been found in the grass conservatory, where they do remarkably well with a little care and attention. A light, rich soil, chiefly composed of leaf mould, river sand, and garden loam, with good drainage, suits them admirably. They require a trellis for their support, and are propagated by layers put down in March, which are ready for transplantation in the rains. The following varieties (of which No. 4, with its superb flowers of a pink changing to rich crimson, is by far the loveliest) are cultivated in Calcutta gardens:—1. **D. Amabilis**; 2. **Amœnæ**; 3. **Boliviensis**; 4. **Brearleyana**; 5. **hybrida**; 6. **insignis**; 7. **magnifica** (syn: **acuminata**); 8. **ornata**; and 9. **Regina**.

Roupellia.

R. grata—CREAM-FRUIT-TREE.—Probably so named from the abundance of cream-like juice it yields when wounded; native of Sierra Leone; a very extensively-rambling shrub, requiring considerable space for its full growth, though easily kept small by cutting in. The young stems are of a rich chocolate-brown colour, and the leaves lanceolate, pointed, from three to five inches long, smooth, of rich polished green, and rather thick. Flowers large, leathery, bell-formed, with expanded limb, white tinged with brownish-purple, with a crown of ten purple teeth in the throat, attractive just as they are expanding, but not very agreeable on near inspection when fully opened. From the high representations given of this plant, before its introduction to England, it appears to have caused some disappointment on its arrival there. Sir J. Paxton says of it: "It is difficult to imagine a flower with more uninviting appearance." But this is doing it injustice: for though possibly not very ornamental in a stove, it undoubtedly has a handsome and imposing appearance in our gardens, where it thrives well. In the cold season large plants will occasionally bear a seed-pod or two, but very rarely. Propagated easily by cuttings in the rains.

OLEACEÆ.

Olea.

1. **O. fragrans.**—A small shrub, four or five feet high, native of China, of very slow growth, but when in a thriving condition rather ornamental, with its oval-pointed, rigid leaves, of a peculiar bluish tinge; blossoms from February to March with very small, pure white, delightfully fragrant flowers, borne in small bunches, situated closely upon the stems. Mr. Fortune says that the Chinese make great use of the flowers to perfume their teas, and that the scent they impart is more abiding than that of any of the flowers employed for the purpose. The plant is much cultivated in the Calcutta gardens, but is always considered choice and valuable from the great difficulty experienced in propagating it; layers are so long in striking that it is commonly full a twelve month before they are ready for removal. Mr. Ross, however, late head-gardener of the Calcutta Botanical Gardens, has stated* that the better way is to strike cuttings in sand under a hand-glass, and that with careful shading and judicious watering young plants may be thus obtained, with tolerable certainty, within a much shorter time. Mr. Errington, however, head-gardener of the Agri-Horticultural Society, assured me that a very large proportion of plants so raised and potted off perished during the succeeding hot season. Dr. Voigt mentions a variety with red flowers; this I have never seen nor heard of.

2. **O. grata.**—A neat-looking shrub, in character of foliage hardly to be distinguished from the last, but far more thriving, and therefore more ornamental. The flowers possess no fragrance whatever.

3. **O. myrtifolia.**—An exceedingly agreeable and chaste-looking shrub; in habit, character, flower, and scent of the flower so much resembling the Privet of the English gardens, that it might be very readily mistaken for it; in blossoms during most of the cold season.

4. **O. Capensis.**—Likewise a pleasing shrub, very similar to the last, but not blossoming, as Dr. Voigt states, in the locality of Calcutta.

Osmanthus.

O. ilicifolius.—Lately introduced, and described as a very elegant evergreen Japanese shrub, with holly-like leaves.

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* In a communication to the 'Journal of the Agri. Hort. Society.'

Syringa.

S. vulgaris.—THE LILAC.—I have never heard of the existence of this old familiar flowering shrub of the English gardens on the plains of India; undoubtedly the climate must be utterly unsuited to it; for it can hardly fail of having been at some time introduced. It can, however, be successfully grown on the hills.

Forsythia.

F. viridissima.—A small shrub of spreading habit, native of China, where, when in full blossom, it is said to be a most beautiful object, blossoms in January, when the plant is quite leafless, with flowers very similar to those of the Yellow Jasmine, but from the scanty way in which they are produced upon the bare stems, the plant in this country at least is not particularly attractive. It is said to be benefited by being transplanted, and that it is easily propagated by layers or cuttings.

SOLANACEÆ.

Cestrum.

1. **C. fœtidissimum.**—A pleasing shrub about five or six feet high, but with leaves that have a detestable smell when bruised; bears at different seasons of the year, drooping fascicles of small tubular flowers, in size and form resembling percussion caps, of a dingy lemon colour. It throws up an immense number of suckers which require to be continually removed, as they produce no flowers and only serve to weaken the plant, the flowers being borne at the ends of the old stems. It yields seed, and is easy of propagation by removal of suckers.

2. **C. aurantiacum.**—Mentioned as a very beautiful shrub, and the most ornamental of the genus; is not met with, I believe, in this country.

Habrothamnus.

H. fasciculatus.—A very choice and beautiful pot-plant, of shrubby habit, about three or four feet high, with soft rough lanceolate leaves, six or seven inches long; bears in great profusion, during the cold season, drooping bunches of deep-crimson flowers, much resembling those of a Heath. It is accounted a very greedy plant, requiring to be often repotted in large pots. It grows with great vigour in the cold months; but large old plants are almost sure to die off in the rains. The plants, I am told, however, are saved, if they be turned out into

the open ground in some shady place. Still, it is best to make sure of a stock of young plants, which are easily obtained from cuttings, for the following season.

Datura.

1. **D. suaveolens.**—A very large spreading shrub, with large thick flaccid leaves, makes a splendid appearance when in full blossom in the hot season, with its immense white sweet-scented flowers, of the size and shape of a cow-horn, the corolla expanded at the mouth with frilled edges. It yields seed, but is easily propagated by cuttings in the rains.

2. **D. sanguinea.**—A shrub of much smaller growth than the last, and leaves of a darker green; flowers also smaller and more tubular, with the rim curled over, of a dull deep-red colour; thrives well at Ootacamund; whence I brought down plants both for the Calcutta Botanical Gardens and for my own garden; but they all soon perished, seemingly unsuited to the climate of Calcutta. There is a variety with double flowers, *i. e.*, one tube coming out of another, and having a curious effect.

Solandra.

1. **S. grandiflora.**—A shrub of considerable size, with very large, oval-lanceolate, smooth, pale-green, rather wavy leaves; bears in the cold season great erect cow-horn-shaped flowers with overlapping rim of a pure milk-white, turning afterwards to a creamy-yellow, their five ribs beautifully washed within with purple, faintly fragrant.

2. **S. oppositifolia.**—A shrub remarkable for its large yellow-green glossy leaves; bears in May flowers very like those of the common roadside Datura.

Both of the above are easily propagated by cuttings in the rains.

Solanum.

Of the large number of species which this genus contains not more than three or four perhaps are worthy a place in the garden, or in fact are much better than mere weeds.

1. **S. coriaceum.**—A neat and ornamental small shrub about two feet high, with lanceolate, smooth leathery leaves two-and-a-half inches long; bears numerous large, pale-purple flowers, succeeded in the cold season by dark purple enamel-like berries of the size of a nutmeg. Propagated by cuttings.

2. **S. amœnum.**—A neat shrub about four feet high, with polished leaves of a bright green, and bearing flowers of a rich purplish crimson. One of the best of this species. Propagated by cuttings.

3. **S. argenteum.**—A beautiful small shrub about three feet high, with Oleander-like leaves of silvery hue, borne on the summit of the stem; bears during the hot season numerous thimble-formed, pendulous, pale-lilac flowers. It is best to grow it in a large pot, for, if planted in the open ground, it becomes very troublesome on account of the numerous suckers it sends up for a great distance around.

4. **S. macranthum.**—A small spreading tree about eight or ten feet high, with very large leaves; nearly always in blossom, and very showy with its numerous immense, purple, potato-like flowers. Propagated by seed.

ASCLEPIADACEÆ.

Cryptostegia.

C. grandiflora.—*Chabuk chhurree.*—A large overspreading and extensively-growing scandent shrub, throwing out twig-like stems of immense length, bearing in pairs, oblong, pointed, smooth, deep-green leaves, from three to four inches long; rather unmanageable, and requiring an outhouse or a large strong trellis for its support. Its handsome and luxuriant foliage forms a fine foil to the very large, bell-shaped, bright, rich purple flowers which it bears during the hot and rain seasons. The plant is also of economic value, as it is a rubber-yielding plant. Propagated by cuttings in the rains.

Holostemma.

H. Rheedii.—A climbing shrub, with large heart-shaped, pointed leaves, five to six inches long; described as bearing in the rains large clusters of large, thick, fleshy five-lobed flowers, of a beautiful mixture of green and white colours. Propagated by cuttings in the rains.

Calotropis.

1. **C. gigantea**: and 2. **Hamiltoniana**—*Mudár.*—These are too well known to need description. They are unquestionably very handsome flowering shrubs, and nothing but their extreme commonness in the jungle and by the wayside excludes them from admission into the garden.

Oxystelmal.

O. esculentum.—A very slender-stemmed herbaceous, creeping plant, with narrow linear leaves about five inches long; a common weed of this country, delighting most in swampy ground by the side of

rivers; bears pretty little saucer-formed flowers of the size of an eight-anna piece; white without and rose-coloured and purple-veined within; troublesome to eradicate sometimes when once established in the garden.

Gomphocarpus.

G. fruticosus.—A very graceful and ornamental small bushy shrub about three feet high, with small linear leaves; very handsome when in blossom in July with its prettily-drooping large umbels of pure-white flowers, displayed in great profusion. It bears a very curious bladder-like seed-pod of the size of a small hen's egg, covered with blunt thorns. Propagated by seed and cuttings during the rains.

Asclepias.

SWALLOW-WORT.

1. **A. Curassavica.**—RED HEAD—BLOOD FLOWER—BASTARD IPECACUANHA—JAMAICA WILD LIQUORICE.—An herbaceous plant about two feet high, with lanceolate, rather downy leaves, two or three inches long; very showy when in blossom in the cold season, with its erect umbels of orange-and-yellow, moderate-sized flowers; bears in great abundance its seed in large curious, inflated pods, from which it is best to renew plants annually, throwing the old ones away.

When young the plants are very liable to be devoured by a particular kind of caterpillar that preys upon them. This should be searched for and destroyed. And when old, the plants often become infested by a reddish-looking aphis or blight-fly, and have then a very unsightly appearance.

2. **A. mexicana.**—A simple little unpretending herbaceous plant about two feet high, with slender stems, naked till near the summit, where it bears decussate, very narrow linear leaves, an inch and a half long. In blossom constantly through the hot and rain seasons, with umbels of pretty, but not very showy, small white flowers. Raised in my garden from seed from England.

3. **A. arborescens.**—A small herbaceous shrub, bearing handsome umbels of pure-white Hoya-like flowers. This I have had in blossom in my garden, raised from seed brought from the Cape.

Tweedia.

T. cærulea.—A small harbaceous perennial, with leaves rather downy; very pretty when in blossom with its flowers of the palest blue;

in size and form like those of Vinca rosea. Sir J. Paxton says that if trained to a pole and exposed to light, it yields flowers of a fine azure-blue. Raized from seed, which it bears abundantly.

Pergularia.

P. odoratissima.—PRIMROSE or COWSLIP CREEPER—WEST-COAST CREEPER.—A very extensive climber, with heart-shaped, pointed leaves, of a dull-green colour; bears bunches of flowers resembling those of the Cowslip, but of a dead, heavy greenish-yellow, scenting the air when in blossom during the hot months with most delightful fragrance; not an agreeable-looking plant at any time, and therefore best planted in some situation a little out of notice. Bears in the cold season thick cylindrical seed-pods, six inches long. Propagated by seed sown in February.

Rhaphistemma.

R. pulchellum.—A large climbing plant with largish heart-shaped, pointed, smooth flaccid leaves, from four to eight inches long; described as bearing large racemes of large, rotate, five-lobed, straw-coloured, sweet-scented flowers; a native of this country. Dr. Wallich says it is the largest flowering Asclepiad with which he is acquainted. Propagated by cuttings in the rains.

Stephanotis.

S. floribunda.—CREEPING TUBEROSE.—Native of Madagascar. A twining shrub with handsome foliage of oblong, thick, shining smooth leaves, three inches long; flowers with the tube about an inch long, swollen at the base, and having five spreading oval segments at the apex, pure-white, fragrant, borne in clusters during the hot and rain seasons; one of the most choice and delightful plants our gardens contain: bears sometimes, in October, a large seed-pod somewhat resembling a moderate-sized Mango. Propagated by cuttings, which should be put down in July or August, in a pot of fine silver-sand, and be kept covered with a hand-glass, and watered as they require it. By November they will become well-rooted; they should not be disturbed, but allowed to remain just as they are during the cold season, from which they are very apt to suffer, in some sheltered place. In the beginning of March they will begin to start into growth, when they should be potted off singly and kept well watered. On becoming larger they require a bamboo trellis. There is a variety known as **Elvaston**, and another as **Profusa**, which do not, however, differ much from the foregoing.

Cyrtoceras.

C. reflexum.—Native of Java. A small shrubby plant with lanceolate, wavy, flaccid leaves, four inches long; bears in August lax drooping umbels of a creamy white, middle-sized flowers, with pedicles an inch and a half long; considered by some a very choice and beautiful plant, but in my opinion not to be compared with some of the Hoyas. It thrives very indifferently in the locality of Calcutta, and is consequently a very rare plant there. Sir J. Paxton says it was introduced into England grown upon a large log of wood, of which decayed portions and leaf-mould seem highly favourable to its growth.

Hoya.

WAX-PLANT.

The species of this curious and interesting genus are rather numerous, but not more than about four or five seem to thrive and blossom well in Bengal. Several are natives of Java: some of these are very beautiful, and have occasionally been introduced into Calcutta; but either from want of sufficient attention being paid to them, or from their being ill-suited to the climate, they have in a short time died off.

Hoyas seem to succeed best in a material consisting of loose potsherds and broken brick, the interstices filled up with leaf-mould and moss, upon which, when water is poured, it will drain away, almost as through a sieve. Their roots love to cling around the potsherds, and being kept damp by the moss and leaf-mould, thrive with prodigious vigour. Large pieces of old mortar or concrete, have been found to suit them admirably.

It is very essential that their leaves be occasionally washed with a sponge, to keep them clean of dust and cobwebs, which are sure to accumulate upon them in a verandah. They produce their flowers in the hot and rain seasons, and have the singular property of blossoming again upon the same footstalks upon which they had blossomed the year before. They are easy of propagation; a single leaf half-buried, stalk lowermost, in fine sand, will soon become a rooted plant. They require shade, and should be grown in pots to which a bamboo trellis is attached for their support.

1. **H. carnosa.**—A native of China; thrives well in this country; the most common and well-known of all the Hoyas, as perhaps it is one of the most beautiful; a vigorously-growing plant with thick oval, pointed, rich deep-green, shining leaves, feather-nerved, the under-surface of a pale-green, against which its blossoms, borne during all the hot and

rain seasons in succession, are admirably relieved. Flowers in compact even-formed umbels of the most delicate flesh-colour, wax-like, chaste, and glistening. They possess none of the honey-like fragrance which several of the species have.

2. **H. bella.**—A native of Moulmein, with leaves somewhat larger than those of the Myrtle, but similar in form. Described in Curtis as "the most lovely of all the Hoyas; flowers more lively than, and differently formed from, those of **H. carnosa**, and most deliciously scented; the corolla of purer white and corona of a deeper purple, resembling an amethyst set in frosted silver." It is often cultivated in England suspended in a basket, over the sides of which its long lax stems hang down, and have a beautiful appearance when in full flower. A rare plant in Calcutta, where it succeeds very indifferently.

3. **H. Paxtoni.**—Of this—often mistaken for the preceding, but differing from it in its leaves narrowing off to the end—Mr. Grote had several plants in his garden at Alipore in a healthy condition, grown upon a log suspended in the shade, and fastened to it with Cocoanut fibre.

4. **H. Potsii.**—A rather extensive climber, with larger leaves than those of any Hoya I have seen, being as much as seven inches long and three-and-a-half broad, of a wedge-form, with three parallel nerves; flowers of a dull buff colour, not showy; thrives well about Calcutta, and is one of the species distributed by the Agri-Horticultural Society.

5. **H. mollis.**—A very extensively climbing plant; flowers thick, wax-like, with a slight purplish stain in the centre, borne in most beautiful compact umbels. Cultivated for distribution in the Gardens of the Agri-Horticultural Society. A plant under the same name, but very distinct from this, in the Calcutta Botanical Gardens, bears pure white flowers with a thick, dark, linear, ray-like mark in the centre; not of much beauty.

6. **H. Simmondsii.**—A species in the Agri-Horticultural Society's Gardens.

7. **H. macrophylla.**—Native of Java; accounted a very noble species; has large, very thick, roundish-oval, three-nerved leaves. A plant or two is to be met with in the Calcutta Botanical Gardens, but it thrives very indifferently there, and is apt to die off.

8. **H. orbiculata.**—Native of Prome and Java: specimens in the Calcutta Botanical Gardens seem to thrive moderately well there.

9. **H. longifolia.**—A curious narrow linear-leaved species, met with in the Calcutta Botanical Gardens, but does not blossom there, I believe.

10. **H. coriacea.**—A native of Java, described in Curtis as "a climbing shrub with the habit of **H. carnosa**, and bearing umbels of

yellowish flowers, having a white coronet with dark brown eye." The sharp-pointed feather-nerved leaf, as figured in Curtis, shows it to be a distinct plant from that issued under the same name from the Gardens of the Agri-Horticultural Society.

11. **H. viridiflora.**—Native of this country; a rambling membranaceous-leaved plant with insignificant flowers. A mere weed.

12. **H. imperialis.**—Native of the Moluccas; introduced from Madras, where it is said to thrive well in Mr. Grote's garden. A very handsome plant, perhaps the finest of the whole genus, with great smooth, fleshy, oval leaves; described as bearing flowers of a fine violet colour, protruding from their centre a staminal crown of yellowish white, and emitting a delightful fragrance.

13. **H. variegata.**—Has its leaves spotted with silver white, and bears flesh-coloured fragrant flowers; has been exhibited at the Calcutta shows.

14. **H. Australis**; 15. **globosa**; 16. **lasiantha**; 17. **picta-aurea, and** 18. **rotundifolia.**—Are also met with in Calcutta Gardens.

Ceropegia.

C. Gardnerii.—A very interesting, slender-stemmed, twining pot plant; bears in January singular convolvulus-formed flowers, with their mouths parted into five divisions, of a greenish-yellow colour, sprinkled with numerous purple spots. It is tuberous-rooted, and dies down after flowering. Propagated by division of roots in October.

Caralluma.

C. fimbriata.—A small pot-plant with fleshy, leafless, cactus-like stems of the thickness of a man's finger; flowers small, white and pink, curiously fringed with hairs. Propagated by cuttings.

Boucerosia.

1. **B. umbellata.**—A leafless plant, with fleshy angular stems like those of a cactus, of the thickness of a man's thumb, about a foot high: a very sprawling and ungainly object when out of blossom; bears umbels of hexagonal flowers of the size of a shilling, purplish-brown, slashed with golden streaks, clustered together so as to form a ball of the size of a small orange: very curious and interesting.

2. **B. crenulata.**—Very similar to the last as regards the heads of flowers it bears, but with stems of not a quarter of the thickness.

Stapelia.

TOAD-PLANT—CARRION-PLANT.

From what Dr. Voigt states it is evident that the Stapelia must be altogether unsuited to the climate of Bengal; for out of more than sixty species introduced from the Cape of Good Hope by Dr. Carey, he says that none flowered, and that most perished during the rain season succeeding their arrival. **S. variegata** thrives well in Upper India, where it bears its curious, toad-like flowers.

CORDIACEÆ.

Cordia.

C. sebestena.—A small tree about fifteen feet high, with disagreeable foliage of rough, coarse, large, oval-formed leaves; young plants, however, in a healthy condition, with fresh verdant foliage, are very handsome, when in blossom during the hot and rain seasons with their trusses of large bright-scarlet, gorgeous-looking flowers. Propagated by seed, or by layers, which take a very long time before they strike and are fit for removal.

CONVOLVULACEÆ.

The species of this order are very numerous, and comprise many plants producing flowers of exceeding beauty, annual as well as perennial. They nearly all thrive well in this country. There is, however, a considerable degree of sameness in them, insomuch that a selection of a few of the most beautiful only is desirable in a garden of limited extent.

Porana.

1. **P. volubilis.**—Native of the North of India; a most extensive climber, covering the side of a high wall or outhouse to almost any extent: blossoms in November, when its numberless light silver sprays of crowded flowers, each resembling a diminutive convolvulus, have a delightful appearance, springing out of their abundant foliage.

2. **P. paniculata.**—Also an extensively scandent shrub, and exceedingly beautiful when in blossom in November; differs from the preceding in the very hoary appearance of its heart-shaped leaves, and in its sprays of numberless pure white flowers having a faint, but agreeable perfume, somewhat resembling that of lavender.

Both of the above are propagated by layers and cuttings.

Aniseia.

A. media.—A pretty little creeper, with slender stems and foliage, about three feet high; bears in the cold season numerous very pretty and delicate-looking middling-sized flowers of a primrose-yellow colour. Propagated by layers and cuttings.

Convolvulus.

C. pentanthus.—More commonly called Ipomœa semperflorens; an extensive climber, with small slender foliage: when in full bloom in the cold season, trained over a trellis or garden railings, a most beautiful object, with its profusion of middling-sized flowers of the purest deep azure-blue; a common plant in gardens about Calcutta. Propagated by division, or from seed, which it bears in the cold weather.

Ipomœa.

1. **I. macrorhiza.**—A thick-stemmed, extensive, and rather unmanageable creeper, requiring some very powerful means of support; with large rough digitate leaves; flowers large, rose-coloured, very handsome, produced in October. Propagated by portions of the root, which is tuberous, and often of an enormous size.

2. **I. dasysperma.**—A pretty climbing plant with fine, rich, dense foliage, concealed in which, for the most part, are produced its moderate-sized pale rose-coloured flowers. Propagated from seed.

3. **I. Jalapi.**—The name formerly given to **I. macrorhiza,** now assigned to a rather stout, coarse-growing climber, with rough crimped leaves; issued from the Saharunpore gardens, and bearing in the cold season lovely flowers of the purest azure blue. Propagated by division of roots and seed.

4. **I. Pes capræ.**—GOAT'S-FOOT CONVOLVULUS—SEA-SIDE POTATOE.—So called from the resemblance of the seeds to a goat's foot. A wild trailing plant of this country, growing abundantly by the sea-side, with curious two-lobed fleshy leaves, in form like those of a Bauhinia; produces in the hot season numerous large rose-coloured flowers. Propagated by seed.

5. **I. vitifolia.**—A very extensive climber of rather slender habit, with leaves much resembling those of a vine: native of this country; bears in February large handsome golden-yellow bell-formed flowers. Propagated by seed.

6. **I. tuberosa.**—SPANISH ARBOUR VINE.—A handsome climber of very extensive growth, with large finger formed, rich, glossy-green leaves; flowers large and beautiful, golden-yellow. Raised from seed.

7. **I. polyanthes.**—AURICULA-FLOWERD IPOMŒA.—Bears bunches of small yellow flowers of little interest. Propagated by seed.

8. **I. ficifolia.**—Native of Buenos Ayres; described as tuberous-rooted, and bearing large dark-lilac flowers which remain unaltered throughout the day. Propagated by seed and division of roots.

9. **I. Tyrianthina.**—A tuberous-rooted climber, native of Mexico. Sir J. Paxton says, "The flowers are very large, brilliant purple, and borne in great profusion;" and Dr. Lindley states that it is "a splendid plant, superior to most of its allies." I have not seen either this or the last in India.

Batatas.

1. **B. paniculata.**—A tuberous rooted extensive climber, with large ornamental finger-formed leaves; bears in September large trusses of very large pure purple flowers. Propagated by division of roots.

2. **B. edulis.**—SWEET POTATO—*Shukkur-Kand.*—A tuberous-rooted trailing plant, with glossy verdant heart-shaped leaves; bears handsome rose-coloured flowers.

Pharbitis.

P. Leari.—Native of Buenos Ayres; a superb creeper, one of finest of the whole order; grows over a large extent of trellis, and produces a succession of large fine deep-blue flowers, very similar to those of Ipomœa rubro-cærulea, though not borne so profusely, all the year through. I have never found it produce seed, but the stems take root wherever they touch the ground, and thus plants are easily propagated.

Rivea.

R. Bona nox—MIDNAPORE CREEPER.—A creeper of strong woody habit with round leaves; blossoms in September, opening in the evening its large white flowers, which are rather flimsy and unattractive, but which emit a delightful carnation-like fragrance. Dr. Roxburgh says of it that "in fact it is the Prince of Convolvulaceæ." Produces seed in abundance, from which it is easily raised during the rains.

Argyrea.

1. **A. argentea.**—A large-growing twining plant, with heart-shaped leaves, the under surface of which is covered with bright silver-coloured silky down; bears at the end of the rains moderate-sized white flowers with a tinge of rose-colour. Propagated by layers.

2. **A spledens.**—A twining plant of most extensive growth, with heart-shaped leaves, the under-surface of which has the same silvery appearance as those of the last; bears in the rains numerous pale-pink flowers. Dr. Roxburgh says of it: "a most beautiful plant, far exceeding every other species I have yet met with." Propagated by layers and seed.

3. **A. cuncata.**—A scandent shrub, in character and flower wholly unlike either of the two preceding; leaves roundish, heart-shaped, and with no silvery down on their under-surface; bears at the beginning and end of the cold season moderate-sized funnel-formed deep bright Tyrian-purple flowers. It is a native of the Mysore country, where it may be seen growing wild in every shady spot. Dr. Roxburgh observes of it: "This, when in blossom, is one of the most beautiful of the whole order; the large, very bright, deep-purple flowers make it particularly conspicuous amongst its own deep-green leaves, and this is much augmented by making it run over any other stout plant with deep dense green foliage." At the foot of the Nilgherries it produces seed in great abundance, but Dr. Wallich says he has never known it to bear a single seed in the Calcutta Botanical Gardens, and that moreover it is difficult to propagate by layers.

4. **A. nervosa**—ELEPHANT CREEPER—*Gau-putta.*—An immensely powerful, shrubby, twining plant, with great roundish heart-shaped leaves; bears large rose-coloured flowers. It is quite unmanageable in a garden, except where it can be trained up some tree, or over an outhouse. Raised from seed during the rains.

POLEMONIACEÆ.

Phlox.

One or two varieties of perennial Phlox, bearing respectively white and pink flowers, are now to be found tolerably common in Calcutta, and are in blossom the greater part of the year. The flowers borne in the tuft-like heads are very handsome. With me plants have succeeded better in the open ground than in pots. They are herbaceous, and are easily multiplied by division. On the hills several varieties are cultivated, and thrive to perfection, planted out in the border.

Ipomopsis.

1. **elegans.**—A very beautiful biennial, with finely-cut leaves; bears handsome spikes of bright-scarlet flowers. Plants raised from seed sown in October, when they can be kept through the hot and rain

seasons, blossom prettily in the following cold weather; but they are nearly sure to die off at the close of the rains. In the North-West Provinces, however, I succeeded in preserving plants till they blossomed.

Cobæa.

C. scandens.—A rather extensive and very ornamental climber, with fine glossy, finger-formed foliage; flowers very large, bell-shaped; on first opening of a greenish-sulphur colour, turning some time afterwards to a fine deep purple, and then remarkably handsome. The seeds are usually sown in October with the annuals, and if they germinate, as about one or two out of a large number may do, the plants must be carefully kept through the hot season till the following cold weather, at the end of which, in March or April, they will come into blossom. They require large pots, to which a trellis of split bamboo is attached for their support. The mode of cultivation recommended in England is that the roots be "limited to some space filled with lime and brick rubbish, in which the plant blossoms liberally, and of a brighter colour." It is very difficult, I understand, to keep it alive through a second season.

HYDROPHYLLACEÆ.

Wigandia.

These, which may be raised from seed from England, are described as majestic perennial plants, with large ornamental undulating foliage. W. Vigieri and one or two others have been introduced, and are chiefly remarkable for the silvery down of their leaves and stems. Cultivated on the plain as a winter annual only.

PLUMBAGINACEÆ.

Statice.

S. duriuscula.—A small herbaceous perennial, mentioned by Dr. Anderson as bearing in the morning, during the hot season, an abundance of pale-pink flowers, which drop off in the afternoon.

Armeria.

A. cephalotes—THRIFT.—A dwarf, herbaceous, edging plant, with narrow grass-like leaves; bears large heads of rather large, handsome

rose-coloured flowers; thrives well at Ootacamund, but is not met with commonly in the plains. Propagated by cuttings in February.

Plumbago.

1. **P. Capensis.**—A small prostrate-growing shrub, with foliage arranged in a succession of whorls of five unequal lanceolate leaves, from half an inch to two inches long; one of the commonest as well as one of the most ornamental plants of our Indian gardens; bears in the hot and rain seasons a profusion of pale azure-blue flowers of the same size and form, and arranged in the same manner as those of the Phlox; is benefited by being pruned in the cold season. Propagated by cuttings in the rains.

2. **P. arpentæ.**—A native of China; much resembles the last, but produces flowers of a much finer and deeper blue. Plants have at at various times been introduced into this country, but have not long survived, being seemingly unsuited to the climate. Propagated by cuttings in November.

3. **P. rosea.**—A small shrub, with prostrate stems; native of this country; bears in the cold season, crowded racemes of moderate-sized pale, pinkish-scarlet flowers, not unlike those of the scarlet Ixora, exceedingly brilliant and beautiful. The beauty of the plant, however, is much impaired by many of the leaves appearing generally in a decayed condition; requires shade and moisture. Propagated by cuttings in the rains.

4. **P. Zeylanica.**—A small, slender, not very pleasing shrub, about three feet high; bears at nearly all seasons racemes of small white sparkling flowers, very clammy and disagreeable to the touch; bears seed in abundance, from which it can be easily raised in the rains.

PRIMULACEÆ.

Primula.

1. **P vulgaris**—PRIMROSE.—I have never seen this plant on the plains of India. One of our principal amateur gardeners in the vicinity of Calcutta told me he had taken every possible means he could think of to cultivate it in his garden, but in every instance without success. In the 'Journal of the Agri-Horticultural Society' I find it stated by Captain Hollings that they had "the English Primrose in magnificent blossoms at Lucknow on the 30th August, 1844." On the hills, however, it thrives and blossoms to perfection.

Var. Polyanthus.—This I have seen only at Ootacamund, and thriving but very indifferently even there.

2. **P. veris**—COWSLIP. 3. **P. Auricula.**—These two plants are, I believe, utterly unknown in India; and the attempt to introduce them would, I make no doubt, only result in complete failure. It may, however, be stated that all the foregoing can be grown to perfection on the hills.

Cyclamen.

SOWBREAD.

A genus of small bulbous plants, bearing pretty, delicate, shuttle-like flowers: not cultivated with success in Lower Bengal; but in Upper India, they grow and bloom freely with a little care; while on the hills they come to great perfection. The bulbs should be put down in October on the plains, and February on the hills. A soil composed of leaf-mould, river sand and garden loam in equal parts, suits them best. The drainage must be thorough.

MYRSINACEÆ.

Mæsa.

M. racementosa.—A rather large tree, suited only for a garden of great extent; very beautiful in the month of February when in full blossom, with its unbounded profusion of large sprays of very small pure milk-white flowers. Propagated by seed and cuttings.

Ardisia.

1. **A. solanacea.**—A large shrub, native of India, from four to five feet high; in every respect beautiful, in foliage as well as in flower. Leaves oblong, pointed, smooth, glossy, somewhat succulent, four to six inches long; bears at nearly all seasons compact corymbs of pretty rose-coloured flowers, arranged somewhat in the manner of those of the Hoya, in form like those of a Potato, having a fine effect, relieved by the dense verdant foliage. The flowers are succeeded by ornamental bunches of small, black, shining berries. Propagated by seed in the rains.

2. **A. crenulata.**—A shrub much of the same character as the last; bears also very similar flowers, but of a whitish colour, and not nearly so showy. The ornamental character of the plant mainly consists in the beautiful rose-coloured berries by which the flowers are succeeded in the rains. Propagated by seed in the rains.

3. **A. umbellata.**—A large shrub like the two preceding; bears corymbs of dull white flowers, succeeded by an unbounded profusion of blackberries of the size of a pea, in the cold season, when it has rather an ornamental appearance. Propagated by seed in the rains.

4. **A. paniculata.**—A large shrub, quite distinct in habit from either of the preceding, having somewhat of the aspect of a Dracæna. It sends up long bare stems about ten or twelve feet high, from the summit of which its large lanceolate leaves, from six to twelve inches long, spread forth, and from among these project large, long, pink-stalked, plume-like panicles of numberless small pale-pink flowers. Blossoms principally in February and March. Propagated by cuttings in the rains.

Jacquinia.

1. **J. ruscifolia.**—A very large round bushy shrub, four or five feet high, with narrow lanceolate leaves, from one-and-a-half to two inches long, ending in a needle-like point; bears in the hot season a great profusion of small, star-like, tubular bright-orange, rather pretty flowers. The whole shrub is of a dark sombre hue. The wood is exceedingly hard, and the plant is rather difficult of propagation. Increased by division of roots.

2. **J. aurantiaca.**—Is in most respects very similar to the last, except in having somewhat larger leaves.

JASMINACEÆ.

Jasminum.

JASMINE.

Chumbelee.

A very numerous genus, a few of the species of which claim admission into every garden, some for the fine fragrance of their blossoms, and some for their sparkling beauty when covered with their numberless white, star-like flowers. Some two or three have foliage for which alone they may be considered ornamental; but several are very coarse-looking shrubs, and far from attractive, except when in blossom. These latter it is well to prune in closely after flowering, and keep as small and compact as possible. Many are natives of the hills of India, though thriving well in the plains. All are propagated easily by cuttings or layers during the rains.

1. **J. angustifolium.**—A small shrub with long twig-like stems, along which grow pairs of small oval, pointed, glossy leaves, about an

inch in length; bears in the hot months, in continued profusion, small white, star-like, exquisitely fragrant flowers. A delightful plant for perfuming the verandah during the time it is in bloom. Dr. Roxburgh says of it: "It is one of the most beautiful species of Jasmine I know. It is constantly covered with leaves, and their bright, shining, deep-green colour renders it always beautiful, and particularly well adapted for screening windows, covering arbours, &c."

2. **J. approximatum.**—An unatrractive shrub but for the curious spider-like flowers it bears in March, with narrow, white, thread-like lobes, more than an inch long, quite scentless.

3. **J. aborescens.**—A tree about ten or twelve feet high, with ovate, cordate, acuminate leaves; very showy in the cold and beginning of the hot season, when loaded with its large corymbiferous panicles of large white fragrant flowers.

4. **J. auriculatum.**—*Jooee.*—A small twining shrub, having large heart-shaped leaves, with a pair of minute leaflets on their footstalks; bears in April numerous middle-sized, white, star-like, very fragrant flowers.

5. **J azoricum.**—A large bushy shrub, with soft downy stems and heart-shaped leaves; remarkably handsome in the month of February, when it bears in great profusion its large crowded heads of scentless flowers, petals white inside and delicately tinged with red on the outside.

6. **6. candidum.**—A shrub with narrow lanceolate leaves two or three inches long; bears in the cold season large white, five-lobed, periwinkle-like flowers, without scent.

7. **J. caudatum** —A not very attractive shrub; bears in the cold season middling-sized white flowers, with tubes an inch and a half long.

8. **J. chrysanthemum.**—Dr. Roxburgh describes this as a stout shrub, from eight to twelve feet high, with stems as thick as a man's leg, and foliage of dark-green unequally pinnate leaves; bears corymbs of ten to twenty-flowered large, bright-yellow, delightfully fragrant flowers; he further observes it is a native of Nepaul, and that "in the Botanic Garden it grows freely from cuttings, and becomes a stout, erect, ramous shrub, even small tree, without the smallest tendency to lean or twine. Flowers more or less the whole year, but, like the other species, the proper season is April and May, at which time it is the most desirable Jasmine I have yet seen." I fancy this must have wholly disappeared from the Calcutta gardens, for I have never met with it.

9. **J. coarctatum.**—This Dr. Roxburgh describes as a very ramous shrub, with no tendency to climb, and says, "it may be readily known, without any other mark, by the great number of flowers which form the little dense corymbs."

10. J. **fruticans.**—A common and very beautiful, small, twig-stemmed, twining shrub, with deep bright-green foliage of ternate leaves; leaflets oval, side ones half an inch, and terminal one three-quarters of an inch long; bears at nearly all seasons five-lobed, bright-yellow, scentless flowers.

11. J. **grandiflorum**—CATALONIAN or SPANISH JASMINE—*Jâtee—Chumbêlee—Kuth-bêla—Kund.*—A very pretty shrub with graceful pinnate foliage, the leaflets less than an inch long; in blossom during the hot and rain seasons with middling-sized, white, fragrant flowers; resembles more than any other species in leaf, flower, and fragrance the common Jasmine of the English gardens. The flowers are much used for perfume in this country, retaining their odour when dried. When in a thriving condition a rather troublesome plant to keep in order, sprawling over a large extent of space, and emitting roots from its stems whenever they touch the ground. It may be trained upon a single stem, which will eventually become as thick as a man's wrist, supporting, at the height of two or three feet, a large bushy head. But thus trained it is very apt to be blown down by strong winds.

12. J. **heterophyllum.**—Of this Dr. Wallich observes: "This ornamental Jasmine is probably the largest of the genus, growing, as I am informed, to a considerable tree." Bears very numerous yellow, delightfully fragrant flowers, but not in the Calcutta Gardens, where, Dr. Voigt states, it has been more than thirty years without flowering.

13. J. **laurifolium.**—A twining shrub of handsome, verdant glossy foliage; leaves lanceolate, pointed, five inches long; bears in February lax corymbs of middle-sized, white, faintly-fragrant flowers.

14. J. **ligustrifolium.**—A shrub of low growth, ornamental if only for its privet-like decussate foliage; leaves oval pointed, deep-green on their upper and pale on their under surface, leathery; bears in February, in vast profusion, small umbels of middle-sized feebly-fragrant flowers.

15. J. **nudiflorum.**—A trailing plant of slender habit, native of China. Flowers an inch in diameter, yellow, scentless, borne in great profusion upon the plant when destitute of leaves. Introduced by Mr. Fortune from Chusan in 1854 into the Agri-Horticultural Society's Garden, where it gradually died off; seemingly unsuited to the climate.

16. J. **officinale.**—The old familiar shrub, with light, graceful, pinnate, deep-green foliage, and cheerful sprays of fragrant white flowers, so commonly trained against the sides of houses in England; hardly, if at all, known here, except that a plant or two may be met with in the Calcutta Botanical Gardens. None were there in Dr. Voigt's time.

17. J. **pubescens.**—A moderate-sized branching shrub, with heart-shaped, deep-green, silky leaves, and the young branches very downy;

bears during the cold season principally, in unlimited profusion, crowded downy umbels of large, pure-white, fragrant flowers, at which time it is exceedingly ornamental; a very common plant. Dr. Roxburgh says it "is in flower during the rains chiefly," which does not quite accord with my observation.

18. **J. sambac**—ARABIAN JASMINE—*Bêl*—*Bêla*.—A bushy under-shrub, from two to two-and-a-half feet high, with ash-coloured branches, and shining oval leaves from four to six inches long and three inches broad; in a perfectly sound and healthy condition would undoubtedly be a handsome plant for its foliage alone; but, from some unassignable cause, scarcely a leaf upon it but is always found either cankered, or partially decayed, or half nibbled away; insomuch that, although indispensable in every garden for the exquisitely fragrant flowers it produces, it is best allotted a place in the background in an unfrequented spot. There are three or four varieties hardly to be distinguished by the leaves, except that they are rounder and more heart-shaped, and more decrepit-looking, the larger and finer the flowers; blossoms during the hot months. Propagated by layers.

1st. The SINGLE-FLOWERED ARABIAN JASMINE—Bears more profusely than the other varieties, and more fragrant flowers.

2nd. The DOUBLE-FLOWERED ARABIAN JASMINE—*Râchel*.

3rd. The GREAT DOUBLE ARABIAN or TUSCAN JASMINE—*Mâtiya*—*Mâgra*.—Bears flowers like little white Roses; in much request among the natives, and sold in great quantities in the bazars, strung together as neck-garlands. In the flowers of this variety, possibly from the plant having been grown in a too-enriched soil, there is sometimes a curious propensity in the petals to become converted entirely into leaves.

19. **J. scandens**.—A scandent shrub, with oblong-cordate shining leaves, from one to six inches long; bears in January and February corymbs of numerous pure white, delightfully fragrant flowers.

20. **J. simplicifolium**.—A spreading shrub, with exceedingly pretty myrtle-like foliage of oval highly-polished leaves, less than two inches long; bears in the hot season small white fragrant flowers.

21. **J. syringæfolium**.—A large twining bushy shrub, with glossy, rich, syringa-like leaves; bears in February coryms of small white faintly-fragrant flowers.

22. **J. trinerve**.—An extensively-climbing shrub, with polished oval, sharp-pointed leaves, remarkable for the strong manner in which their three longitudinal nerves are marked; bears in February flowers very similar to those of the last.

23. **J. sp.**—An unnamed species very common in gardens about Calcutta; a twining shrub, ornamental for its rich foliage of lanceolate, long, pointed, highly varnished leaves, from two to three inches in length; bears constantly, but particularly in February, terminal

corymbs of large, sparkling, white, very fragrant flowers, with the tube and under-side of two of the lobes purple. The calyces also, as well as the unexpanded buds, which are of a shining purple, have a very beautiful effect intermingled with the white flowers. One of the most delightful of the Jasmines, and especially pleasing when in the morning it perfumes the garden with its agreeable odour.

Nyctanthes.

N. arbor-tristis—NIGHT-BLOOMING TREE OF SADNESS—*Hâr Singhâr.*—A tree about ten feet high, of most harsh and disagreeable aspect, common all over India: deserves some situation in the garden, where it can be least seen, for the boundless profusion of small, star-like, white flowers, with orange centre, which it bears each night from September to November, scenting at that time the atmosphere for a wide distance around with a delightful honey-like fragrance. The flowers all drop off in the morning, and the ground becomes perfectly carpeted with them. It is of very rapid growth, and the great long woody shoots which it bears annually should be cut completely in after flowering. It is propagated by seed sown in the rains. Plants should be renewed every third year.

EHRETIACEÆ.

Heliotropium.

H. peruvianum.—HELIOTROPE.—In most works upon gardening the Heliotrope is stated to be a shrub two feet or less in height. This gives a very poor and inaccurate notion of what the plant is in localities most congenial to it. At Ootacamund, for instance, in the Nilgherries, in some gardens it forms a fine compact verdant hedge, three or four feet high; and in one garden in particular a plant might be seen as much as ten feet in height and forty feet in circumference in the form of a dense bush, loaded in its season with blossoms. In the plains of India, however, it never attains to a large size. It succeeds very well in the open border, but is sometimes apt to perish from excess of wet in the rains. It blossoms in the latter part of the cold weather with its trusses of small lilac flowers, so well known for their sweet Vanilla-like fragrance.

The most successful mode of cultivating this plant I have found to be as follows:—Sow the seed in October; pot the seedlings off singly into large pots in which they are to remain permanently, and treat them in the way directed for producing the Tree mignonette; that is, nip off the undermost leaves and buds as soon as they appear, and allow the

plant to run up with a clean stem to about four feet high, supporting it with a bamboo stake. When arrived at that height allow it to form a head. Thus formed it will require no further trouble, as it will show little tendency afterwards to give out shoots below. In September of the following season it will come beautifully into blossom full two months earlier than plants left to themselves would do. Three or four plants thus treated, and placed near the verandah, have a very ornamental appearance, and in the morning particularly perfume the air delightfully. It is also easily propagated by layers in the cold season. There are several varieties, between some of which there is no marked difference. But the one called Voltaireanum, not uncommon in Calcutta, is a very beautiful and distinct one. The young shoots are of a bluish-purple, and the unexpanded trusses of bloom of a very dark-purple colour; the leaves, also, are of a finer and darker green.

LABIATEÆ.

Ocimum.

Toolsee.

Weedy-looking herbaceous plants, with little to commend them to a place in the garden except the agreeable and peculiar fragrance of their leaves; raised from seed, which they produce in abundance.

1. **O. sanctum.**—A small plant with leaves and stem of a dull red-purple, and small purplish flowers; common all over India, and well known for the sanctity in which it is held by the Hindoos; very apt to become a troublesome weed in gardens where it has once established itself, shedding its seed abroad, and producing young plants in profusion, which the mâlees are very reluctant to destroy.

2. **O. basilicum**, *var.* **glabratum**—*Basil—Goolâl Toolsee.*—Pleasing for the freshness of its rather large spear-formed, bright-green fragrant leaves.

Orthosiphon.

1. **O. incurvus.**—A small herbaceous plant, delicately beautiful when in full blossom in the hot season; flowers small, pink, borne very numerously in long spikes. Propagated from cuttings or by seeds.

2. **O. stamineus.**—A very interesting and pretty little herbaceous plant; blossoms in June, with lavender-coloured flowers, curious for their long-projecting white stamens. Raised easily from seed.

Plectranthus.

P. aromaticus—BREAD-AND-BUTTER PLANT.—A low-growing, wide-spreading herb; bears small, pink, insignificant flowers; interesting only for its solid succulent leaves, which possess a pleasant aromatic fragrance. Every slip will readily strike.

Coleus.

A genus of plants remarkable for the exceeding beauty of their leaves. For decorative purposes—especially for growing in mass in large beds—they are unequalled. The forms of leaves are much the same in outline, but varied in being fringed, saw-edged, and fimbriated; while the variation and blending of colours baffles description. Over a hundred varieties are in cultivation, raised by hybridization. The best way to get up a good collection is to obtain seeds from a reliable English seedsman. When once raised, plants can be propagated with the greatest ease by cuttings put down in sand during the rains. A light rich soil suits them best. To form fine bushy plants, the branches should be pinched in when young. They are benefited by being well pruned during the winter, when they require shelter in Upper India.

On the hills they are best grown under glass, or shelter of some sort. During the winter they require a stove shelter. Cuttings can be put down at any time from May to September in sand, with bottom heat.

Anisochilus.

A. carnosus.—A rather pretty herbaceous pot-plant; bears in September small lavender flowers on club-like heads. Propagated by cuttings during the rains.

Lavandula.

L. spica—LAVENDER.—This delightful shrub is easily raised from seed in October, and may be preserved for years, and grown to a considerable size. On the Nilgherries plants of comparatively small size produce flowers abundantly.

Pogostemon.

P. patchouli—*Pucha-pat.*—A coarse-looking, low, herbaceous plant, of no interest whatever in the garden, but for the peculiar strong fragrance of its leaves, which are sometimes gathered and laid in a chest with linen to impart to it a fine scent. Propagated easily by cuttings or slips.

Colebrookia.

Large uninteresting shrubs, with coarse sage-like leaves; bear spikes of small insignificant flowers in March, but hardly deserve the room they occupy in a garden. 1. **C. oppositifolia.**—Flowers pale chocolate. 2. **C. ternifolia.**—Flowers pale green.

Mentha.

M. auricularia.—A small herbaceous plant; very pretty when in blossom in November, with small lavender flowers, on dense spikes, three or four inches long, and as thick as a man's little finger. Propagated by slips or cuttings.

Salvia.

Of the several handsome species of this genus few, it has been found, can endure the climate of the plains.

1. **S. splendens.**—A rather large herbaceous plant, very superb when in full blossom; the large gaping flowers, together with their large bracts, being of a brilliant scarlet. Some care must be bestowed to keep it in a healthy and thriving condition, otherwise it looks unsightly, notwithstanding its handsome flowers. It soon becomes old and worn, and must be frequently renewed from cuttings put down in November. It requires shade, bearing indifferently much if any exposure to direct sunshine.

2. **S. angustifolia.**—An herbaceous plant with long slender prostrate stems, and of very untidy habit; flowers small, pretty, of a bright pure blue, produced in the cold season; does not thrive well unless transplanted occasionally, which is best done in October. Propagated by cuttings in November.

3. **S. patens.**—A tuberous-rooted herbaceous plant; bears very large, exceedingly beautiful flowers of the purest azure-blue; thrives well and is a common plant at Ootacamund, but is rarely to be met with on the plains, the climate of which it cannot long endure. Propagated by cuttings in November.

4. **S. coccinea.**—A small herbaceous plant, nearly always in blossom, with long erect spikes of small crimson-scarlet flowers, rather pretty, but not very showy. Raised easily either from slips or from seed in October.

Dracocephalum.

Herbaceous plants, remarkable principally for the aromatic fragrance of their leaves; particularly.

D. canariense—BALM-OF-GILEAD.—They are best treated as annuals, as they cannot be kept through the hot and rain seasons without more care bestowed on them than they deserve. Sow the seed in October with the annuals.

Phlomis.

P. leonurus.—JERUSALEM SAGE.—A coarse-looking, bushy plant, about three feet high, rather gaudy when in full bloom in the cold season, with its succession of large bright-orange flowers produced in crowded whorls along the stem. Propagated readily from cuttings in November.

Holmskioldia.

H. coccinea.—A large woody, spreading shrub, five to seven feet high; bears, in October and November, very curious flowers, in form like diminutive chamber-candlesticks, of a bright tawny-red, in boundless profusion, and is then a most beautiful object; requires to be cut closely in after flowering, to keep it compact and within bounds. Propagated from cuttings; or from seed in November.

Gomphostemma.

G. melissæfolium.—A small herbaceous plant; bears, in September, whorls of largish orange-coloured flowers; a coarse-looking thing at best, much resembling a Dead-nettle.

VERBENACEÆ.

Aloysia.

A. citriodora.—LEMON-SCENTED VERBENA.—Well known for the fine fragrance of its leaves; a very common plant in the gardens about Calcutta; bears, principally at the beginning and end of the cold season, long, pretty, graceful spikes of very small milk-white, fragrant flowers. At Ootacamund it grows to become an immense shrub, six or eight feet high, with stems thicker than a man's arm, and remains constantly covered with a profusion of blossoms; plants, however, on the plains soon become decrepit and unsightly, and are rarely found more than two feet high before they die off. It is best, therefore, to renew plants by laying down slips or cuttings in the cold weather. These should be put in a flower-pot filled with silver-sand, and kept in a shady place till they strike, which they do very readily. The young plants should then be potted singly, and by the rains they will become large and handsome.

Verbena.

Many of the species, hybrids, and varieties of this beautiful genus may be met with from time to time in the Calcutta gardens, but no dependence can be put upon their being found there permanently, as they are very apt, under any treatment whatever, to die off towards the end of the rains. The losses, however, may be repaired by repeated sowings. If a packet of choice seeds be procured from England and sown in October, a good supply of plants of several varieties may be raised, which will come into blossom in March; and little difficulty will be found in keeping these till the following cold season, during which they will blossom beautifully. Some two or three of the commoner kinds it may perhaps be found not necessary to multiply in this way, as they are of a robust nature, and young plants propagated from layers will survive the hot and rain seasons. From their trailing habit when put out in the border, Verbenas have usually an untidy appearance. Small circular or oval beds, each filled with a distinct variety, have a most charming and glowing effect during the very long time the plants last in the full height of their bloom.

The variety known as "scarlet," is a perennial in this country, and one of the most brilliant in colour. Easily propagated by layers and cuttings in the cold months.

The Verbena loves a soil well enriched with vegetable mould, but is impatient of wet. The beds in which it is planted should be slightly raised, so as to form low mounds. The tendency of the stems to throw out roots, wherever they rest upon the earth, sufficiently indicates that it requires frequent renewal of soil. The finer kinds never, that I have been able to discover, produce seed here.

1. **V. venosa.**—Readily known by its long, spear-formed leaves; bears dull-lavender flowers; a very robust but not an attractive plant.

2. **V. bonariensis.**—A coarse-looking plant of upright growth about three feet high; bears large clusters of very small uninteresting lavender flowers.

Stachytarpheta.

The following are raised from seed :—

1. **S. mutabilis.**—A large shrubby, herbaceous, rather coarse plant, with rough woolly leaves; flowers small, Verbena-like, bright-red, borne upon spikes sometimes two or three feet long; nearly always in bloom.

2. **S. jamaicencis.**—An herbaceous plant with smooth, pale-green leaves; produces long spikes of small blue flowers; common, and of little merit.

3. **S. orubica.**—An herbaceous plant distinguished from the last from its leaves being strongly veined and much crimped, and its flowers of a violet colour.

Lantana.

A genus of very beautiful flowering plants, remarkable for the strong sage-like scent of their leaves; nearly always in blossom during the warmer months; very rapid in their growth, and requiring repeatedly to be cut in, to keep them within bounds; easily propagated by cuttings or by seed, which they all bear freely.

1. **L. trifolia.**—A small common, somewhat coarse-looking plant, but, notwithstanding, rather pretty, blossoms with heads of lavender-coloured flowers, succeeded by berries of the same colour, bright like enamel, and as ornamental as the flowers.

2. **L. selloviana.**—A small trailing plant, having altogether the habit and appearance of a Verbena, except for the bright little blue berries it bears, and the scent of its leaves; flowers pale purple.

3. **L. camara.**—WILD SAGE.—A large bushy shrub, four or five feet high; most rapid in its growth, with dark-green foliage of oval-notched, rough, powerfully-scented leaves; a common plant, often found growing wild, nevertheless exceedingly beautiful when in full blossom, as it nearly always is, with its numerous small, semi-spherical compact corymbs of orange and yellow flowers, succeeded by bunches of purplish-black seeds. There are a great many varieties, named according to the colour of the flowers they bear. 'Le Bon Jardinier gives the names of as many as eighteen, of which some half-dozen, perhaps, are now cultivated here.

4. **L. nivea.**—In habit and foliage similar to the last; flowers white, tinged with lavender, with yellow centre; exceedingly delicate and beautiful.

There are many French hybrids also in cultivation, which are best raised from seed annually.

Citharexylon.

C. subserratum.—A large handsome shrub, with much of the appearance of a Duranta, with dark-green verdant foliage; bears during the rains long drooping spikes of numerous small, milk-white, very fragrant flowers. Propagated by cuttings in the rains.

Clerodendron.

A genus that comprises some of the most beautiful plants with which our gardens are adorned. Nothing can possibly surpass the

loveliness of some of the species, particularly the seven first described below. The several species do not appear as yet to have been well determined. "Whoever," says Dr. Lindley, "shall investigate the true distinctions between the beautiful species of Clerodendron with scarlet inflorescence, will find as ample a harvest of confusion to be reaped as he can desire."*

Some occasionally yield seed, and all may be propagated without difficulty by cuttings put down in the rains, or from offsets or suckers, which most species send up abundantly. Sir J. Paxton observes: "Flowers are produced from the top of the current season's shoots; therefore cut away wood of the previous season to within two or three buds of the base."

1. **C. kæmpferi.**—A shrub about three feet high; flowers, borne in April, of a coral-crimson colour, in a large close mass, surmounting the head, of dark handsome leaves, in a very stately way. Sir J. Paxton says this is probably identical with **2. C. fulgens.** It, as well as **C. pyramidale,** is most easily propagated by cuttings of the young shoots, which soon become handsome plants.

3. **C. urticæfolium.**—A plant of lower growth than the preceding, but very similar in the manner of flowering. Its deep rich green leaves set off admirably the exquisite crimson-scarlet heads of flowers which rise above them in September.

4. **C. pyramidale.**—A shrub three or four feet high; bears, during the rains, its flowers in enormous, dense, conical heads, presenting a truly magnificent appearance, though their colour is perhaps somewhat inferior to that of other kinds, being of rather a pallid crimson, not so brilliant as in either of the two preceding.

5. **C. hastatum.**—A tall-growing shrub, native of Sylhet; remarkable for its handsome spear-head-like leaves; flowers described as more than five inches long, greenish-white, with the mouth of the throat marked with fine purple dots, borne in April and May.

6. **C. splendens.**—A dwarf climber, native of Sierra Leone; blossoms in large close clusters of gorgeous crimson flowers; of exquisite beauty when in fine condition, as sometimes seen in the stoves in England. In the vicinity of Calcutta it can hardly be kept alive, and flowers, but very indifferently, in January.

7. **C. squamatum.**—The stems of this shrub rise naked from the ground about three feet, and then bear a parasol-like expansion of handsome, rich green, heart-shaped leaves, surmounting which rise the heads of blossom, resembling a mass of bright crimson coral. When in full flower, in April and May, no plant can surpass this in beauty.

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* Edward's "Botanical Register" for 1844, f. 19.

8. **C. sp.** from Mauritius: in Garden of the Agri-Horticultural Society.—Somewhat resembles the last; blossoms in October, producing afterwards large, enamel-like, deep-blue seeds.

9. **C. fallax.**—A shrub about three feet high; produces in March pale violet-coloured flowers in large semi-spherical heads upon slender stems.

10. **C. fragrans.**—A vigorous, low-growing, large-leaved plant; flowers very double, like little roses, white tinged with pink, of exquisitely delicate fragrance, borne in large compact heads during all the hot and rain seasons; the leaves have a most disagreeable fetid smell; a very troublesome plant in the border on account of its throwing up suckers to a considerable distance around.

11. **C. infortunatum.**—A common roadside weed, very pretty, however, in February and March, when bearing its large heads of pinkish-white flowers.

12. **C. nutans.**—A tall shrub, about eight feet high; blossoms in November with an immense profusion of large white, tubular, hanging flowers, presenting a most lovely appearance.

13. **C. siphonanthus.**—A small shrub, native of India; blossoms in May, with a great profusion of white tubular flowers, three or four inches long, when the plant, with its long strap-like leaves, has a very chaste, handsome appearance.

14. **C. odoratum.**—A shrub of considerable size and spreading habit, requiring to be well cut in to be kept within bounds; produces in February and March an unlimited profusion of pretty pale-blue, sweet-scented flowers. There is a variety that produces white flowers.

15. **C. phlomoides.**—A shrub of some size, produces numerous small creamy-white flowers, very sweet-scented, particularly at night; a common jungle plant, hardly deserving admittance into the garden.

16. **C. serratum.**—A large-leaved, coarse, unattractive shrub, nearly always in blossom; flowers dull light-blue, not large nor interesting.

17. **C. thomsoni.**—A most beautiful climbing plant, of recent introducion, bearing during the rains, in great profusion, large corymbs of flowers, with white calyx, and corolla with purple tube and deep-crimson limb; succeeded by purple berries of the size of a pea, very ornamental with the white persistent calyx. Most easily propagated by cuttings in sand during the rains.

18. **C. speciosum** and **19. C. balfomianum**, are recent introductions.

Duranta.

1. **D. plumieri.**—A rather large woody, thorny but handsome spreading shrub, native of the West Indies, about six feet or more high,

with bright-green foliage. Constantly in blossom with numerous drooping bunches of bright azure-blue flowers, succeeded by pretty orange-coloured berries of the size of a pea; a common plant, found in most Indian gardens. From its neat foliage and thorny nature it forms a very pretty garden hedge. Raised easily from seed or by cuttings in the rains.

2. **D. ellisii.**—Differs in no very marked degree from the last, except that its flowers are white and its leaves somewhat smaller. Raised from seed or cuttings in the rains. Forms a good hedge.

Petræa.

1. **P. stapelia.**—A very extensive scandent shrub, with noble lanceolate leaves, native of South America: requires a stout framework of bamboo for its support; bears bright, pure azure-blue, large, star-like flowers, in large, elegant, wreath-like clusters; when in full blossom in October, and more especially in February, one of the loveliest objects in nature the eye could rest upon. It may be also trained as a standard. Propagated by layers, or from rooted suckers, which it not unfrequently sends up.

2. **P. erecta.**—Except in its more upright habit of growth, the difference between this and the last is not very marked. The bracts are shorter, and more resemble the lower petals of the flower, the leaves are smaller, and the plumes of blossom perhaps not so handsome. Propagated same as the foregoing.

Callicarpa.

Not very ornamental plants; bear large bunches of small, uninteresting flowers, succeeded by numerous shot-like berries in October. Propagated by seed or cuttings in the cold months.

1. **C. cana.**—Has large coarse woolly leaves, with berries of a milk-white colour. 2. **C. lanceolaria.**—Rather large coarse leaves, and bears pale lilac flowers. And 3. **C. purpurea.**—A neat shrub with small leaves; bears numerous pretty lavender berries.

Congea.

C. azurea.—Native of Martaban; an exceedingly extensive climbing shrub, sometimes covering entirely the summit of a large tree, and when in blossom in January, and seen from a distance, has a very splendid effect, presenting a large uninterrupted expanse of pale dull-red blossoms, somewhat resembling in form those of Petræa. Propagated by cuttings put down in November.

GESNERACEÆ.

Gesnera.

A very numerous genus of choice, small herbaceous plants; of exquisite beauty when blossoming in a thriving condition; for the most part unsuited seemingly to the climate of the plains, though they do well enough in Calcutta gardens. Most of the varieties are tuberous-rooted, and can easily be increased by division of roots. Some of the succulent leaved varieties are easily increased by inserting a single leaf in silver sand under a hand-glass, during the rains.

I. **G. douglasii.**—A very handsome species, with erect stems about ten inches high, upon the summit of which alone the foliage is borne: leaves lanceolate, four inches long, woolly, of a soft, agreeable yellowish-green; bears, between January and April, rather large tubular flowers of a vivid orange-red. It requires at all times the shelter of a verandah or conservatory. The soil in which it is grown should by no means be dense, or at all impervious to water. In the pot in which it is to be planted lay some large pieces of brick, and over them a layer of cocoa-nut fibre, and then fill the upper half with a light soil of leaf-mould, river-sand, and shreds of cocoa-nut fibre, through which the water will drain down as soon as poured. Easily propagated by removal of the suckers it sends up.

2. **G. tubiflora.**—A native of Buenos Ayres, and a very common plant indeed about Calcutta. The stems lie prostrate upon the ground, bearing at their extremities whorls of woolly lanceolate leaves five inches long; produces, in April, clusters of heavy, but not disagreeably-scented, large, palish Primrose-coloured flowers, of tubular form, the tube three inches long, and then expanding so as somewhat to resemble a white Petunia. The root is tuberous, and might easily be mistaken for a large Potato; should be grown in a pot, but will bear exposure to the weather. Easily propagated by separation of the tubers in the cold season, but the plants, I believe, do not blossom for some time if the roots are much disturbed. Dr. Lindley considers this more properly a Gloxinia than a Gesnera. (See 'Botanical Register for 1845,' p. 3.)

3. **G. leichtlina.**—A very handsome plant; with large heart-shaped, dark-green leaves, rendered soft and woolly by the crimson pubescence with which they are covered, with their under-surface of a deep crimson; in character much like those of some of the Begonias; throws up footstalks two feet high, bearing a spike of pretty pale-vermilion flowers, opening in long succession. The bulbs, much like those of an Achimenes, were sent me from England, and throve and blossomed well in my verandah at Gowhatti.

4. **G. splendens.**—The tuber of the size of a large Potato.

5. **G. magnifica, purpurea.**—These two last also I received from England: they throve in my verandah, but did not blossom. **G. refulgens** is a beautiful-leaved variety.

Besides the foregoing, many other varieties are now cultivated with success in the grass conservatory. It should be borne in mind that the tuberous-rooted varieties die down in the winter, when water should be discontinued. They should be repotted in March.

Achimenes.

A genus of herbaceous tuberous-rooted plants, producing during the rains a continued succession of large, most lovely flowers, in form something like those of the Petuna, but with a more flattened limb The number of varieties is very great, nearly all of which may be easily procured from seedsmen in England. The plants are best kept under shelter from sun and rain, though I have seen them thriving very vigorously exposed to the full force of the latter, greatly of course to the detriment of their tender flowers. Their roots do not go deep into the earth, they therefore need only shallow pots or pans. If pots are used, half fill them with large pieces of brick, then put a layer of cocoa-nut fibre, and fill up with leaf-mould rendered grey with silver-sand and lightened with shreds of cocoa-nut fibre. If pans are used, lay at the bottom of them a layer of cocoa-nut fibre, and fill up with soil the same as used with pots. The pans should then be let down in empty flower-pots, the rims of the former resting upon the rims of the latter, as represented by Fig. 19, page 74. By this means the plants will be raised up to view, and vermin will be prevented from creeping in through the hole at the bottom of the pans. When the tubers begin to start about March, put them in the soil an inch deep, not more than three at the most in each pan. After they have appeared above ground, water them constantly, or they will be liable to die down again. They remain in blossom more or less from June to October. In November cease to water them, and allow them to die down. They may then be left in their pots just as they are, and put away in some dry place till the time comes round again in March to repot them. Or the tubers may be taken up; but when this is done great caution must be used, and the soil be watered some hours beforehand to render it as loose as possible, as the tubers, from their scaly nature, are very brittle, and easily damaged. The several kinds may then be put away separately in jars or pots of sand till the season to repot them.

An interesting method of growing Achimenes is to put a tuber in a handful of leaf-mould, and bind moss round it with string, so as to

form a ball of the size of a Pumelo. Lay it upon a flat earthen pan, with holes for drainage. Suspend the pan in the verandah, and keep the moss constantly damp. The Achimenes will thrust itself through the moss, and thrive and blossom, and form a very pretty ornament. I have grown **A. longflora** and **A. alba** in this way.

Mr. Grote had in his garden at Alipore a small circular bed, under the shade of a tree, in the open ground, planted with Achimenes, which, he told me, throve and flowered well there. The bed had a good foundation of kunkur for drainage. And Mr. S. Jennings at Allahabad says : "I know of nothing that equals Achimenes for the open border during the rains."

None of the varieties appear to bear having their shoots shortened ; and if much damaged in this way by the wind or any other cause, they do not recover themselves so as to thrive so well afterwards. The tops of the shoots, planted in sand, and well-watered, soon form vigorous young plants. I have tried to strike other portions of the shoots, but did not find any successful, except cuttings with a single joint. This kind of cutting, with about an inch of stem left below the joint, so as to serve as a peg to secure it in its place, is let into the soil, so that the joint with its contiguous pair of eyes and leaves is half buried. This will soon form a rooted plant. A sprig also put into a phial of water soon forms roots. Except, however, in case of accidental breakage of a rare specimen, propagation by cuttings is not worth while resorting to, as the plant is so prolific in producing tubers.

The following I have had blossoming satisfactorily in my verandah ; they comprise none of the so-named Tydæa kinds, several of which I have tried, but without success as might have been expected, since they do not make scaly tubers, but only slender underground stems, nor suffer drying like Achimenes.

1. **A. longiflora major.**—Flowers large, of a clear, pale azure-blue ; this is certainly about the most beautiful of all, as it is the commonest and most hardy. The plant is distinct from others in its tendency to throw up numerous suckers at a distance from the main stem.

2. **A. longiflora alba.**—A variety of the former and equally beautiful, with pure-white flowers.

3. MAUVE QUEEN, flowers very large, of a deep, pure azure-blue, with orange eye, somewhat similar to longiflora major ; but the plant is of a different habit, rather delicate, and not very free in blooming ; 4. AMBROISE VERSCHAFFELT, flowers French-white, beautifully pencilled with violet : a delightful plant and a profuse bloomer ; 5. DR. BUENZOD ; 6. CARL WOLFORTH ; and 7. PARSONI, are ordinary kinds of different shades of purple ; 8. VIOLACEA SEMIPLENA, a profuse bloomer, very handsome, with curious half-double purple flowers ; 9. GRANDIFLORA,

a very distinct plant, with large handsome leaves; flowers of a delicate rose tint, with white eye; the bulbs are as thick as a man's little finger, and as much as four inches long; 10. ROSEA ELEGANS, a slender plant, with very small leaves; flowers small, bright pink; 11. METEOR, and 12. CARMINATA SPLENDENS, of different shades of crimson; 13. VIVICANS, and 14. ECLIPSE, are all but the same; flowers not large, of dazzling scarlet; 15. SCARLET PERFECTION, flowers carmine-scarlet.

Amongst those mentioned as the most beautiful are, Aurora, described as very fine, with flowers two inches in diameter, deep heavy scarlet, with light yellow eye, besides—

Adonis, amabilis, elegans, Escheriana, Estella, gigantea, ignea, magnifica, Mazeppa, Roezlia.

Besides the above scores of others have been raised.

Gloxinia.

This, like the last, is a very numerous genus of tuberous-rooted herbaceous plants, some remarkable for the velvet-like lustre on their large oval leaves. They produce roundish bell-formed flowers of astonishing splendour during the rains. They are easily obtained from England, and sometimes blossom beautifully, but do not seem to last long in this country, owing perhaps to sufficient care not being bestowed upon them. The mode of cultivation suited to them is the same nearly as that given for Achimenes. Sir J. Paxton observes that "the richest colours are usually produced in somewhat mellowed light, and that blossoms shaded by the leaves will be found of a richer tint than more exposed blossoms." They require some situation under shelter from the sun and from the rain. They thrive vigorously and blossom well in grass conservatories. Mr. Coles Hardinge states that at Rangoon he hybridized the flowers of plants he had in bloom there, and was very successful in raising fresh plants with the seed he saved from them. He sowed the seed in well-drained pans, filled with a mixture of sand and sifted leaf-mould, and covered with a piece of glass. They germinated in a week, and the seedlings were fit for pricking out singly into small pots in about a month: then they were covered with bell-glasses, till they had become strong and formed tubers. Mr. Coles Hardinge owed much of his success, I believe, to his seed having been fresh, as that which I have procured from England I have found to fail in germinating. Dr. J. Beaumont, of Indore, writes to the Agri-Horticultural Society:—

"I find Gloxinias do better if made to flower twice a year. I plant the bulbs in January; they flower in April, are dried in May, repotted and watered as soon as they begin to sprout in July, and they flower again in August and September. Treated thus, the bulbs are finer, larger, and grow much stronger than if flowered only once; and there is the advantage of two crops of flowers."

G. maculata.—A very common plant in Calcutta, altogether distinct from any of the florists' kinds spoken of above; of large strong-growing habit, handsome for its bright, glossy, succulent, heart-shaped leaves; bears in November, when it can be brought to blossom, which it is very shy of doing, large pale-blue, tumid, bell-formed flowers. It should be potted in a light rich soil, and be supplied with abundance of water during the time of its growth. Shortly after the time of flowering the stems die down, when the large scaly tubers should be put away undisturbed in their pots till about May, at which time they begin to start again, and should be repotted.

Æschynanthus.

Plants of this genus are natives of humid forests, and several are found in Assam. As regards their leaves and manner of growth, they much resemble the Hoya, but produce flowers very dissimilar. In their native localities they are epiphytal, and in Europe are said to succeed best in reduced moss, with a little heath-soil and potsherds, as also to flourish most luxuriantly on a log of wood covered with moss, fastened with copper wire. The above mode of culture points out the necessity of a light open soil of vegetable mould for their cultivation in this country. In the vicinity of Calcutta they thrive, generally speaking, but very indifferently, though plants of so much beauty as to deserve every attention bestowed upon them to make them thrive. Their cultivation in the Betel-house is attended with marked success, though they flower but poorly there. Propagated by cuttings in the rains.

1. **Æs. grandiflorus.**—A native of India; bears in September heads of large trumpet-like flowers, of a beautiful crimson-scarlet colour with dark stripes.

2. **Æs. sp.** in Calcutta Botanical Gardens.—Altogether smaller in habit, is also very beautiful in blossom, producing flowers of the same colour and at the same season as the last. 3. **Æs. Roxburghii.** Flowers described as scarlet. 4. **Æs. zebrina,** 5. **fulgens,** and 6. **splendens,** are also to be met with in Calcutta. All propagated by cuttings in the rains.

CRESCENTIACEÆ.

Crescentia.

1. **C. Cujete**—CALABASH-TREE.—A tree-shrub: flowers large, bell-shaped, greenish-white, with dull-purple lines. Principally interesting for the pumpkin-like gourd it bears, of which Mr. Gosse says, in

Jamaica admirable domestic vessels are made. Propagated by seed in the rains.

2. **C. acuminata.**—A curious evergreen shrub, interesting from the character of its stems, which bear wings, rendering them of the same broad flat appearance as the leaves. Propagated by seed and cuttings in the rains.

Kigelia.

K. pinnata.—A large, coarse-looking tree, unfit for the garden. Remarkable for the curious way in which the bunches of dull, liver-coloured flowers dangle from different parts of it at the end of their rope-like flowering stems, six feet in length. These are succeeded by enormous cucumber-like pods, sometimes in bunches of two or three together. Propagated by seed in the rains.

BIGNONIACEÆ.

Bignonia.

The species of Bignonia, natives of this country, are nearly all trees of large size, producing great dull red and yellow, unpleasantly smelling flowers. Those most deserving a place in the garden have been introduced into India, and are plants of scandent habit; these, when in full bloom, are truly charming objects. They are benefited by being well pruned in after they have done flowering. All are exceedingly easy of propagation, either by layers or cuttings, which strike freely.

1. **B. Chamberlaynei**; *syn.* **equinoctialis.**—A most extensively-spreading shrub: covers a large space of trellis or wall in a very short time, and requires to be often pruned in to keep it within bounds; throws out slender green stems to a great length, along which it bears pairs of pinnate leaves. Each leaf consists of two oval, pointed, wavy, smooth, shining leaflets, two inches long. From the axils of the leaves are borne primrose-coloured thimbled-formed flowers, with the tube two inches long, produced in great profusion nearly at all times, contrasting beautifully with the richly verdant and graceful foliage.

2. **B. crucigeria,**—A climbling shrub of the habit of the preceding, and bearing, in the hot season, flowers similar in form and size, of a dull tawny-yellow colour; not a common plant, nor a very attractive one.

3. **B. gracilis.**—An extensively-climbing shrub, with rich, varnished-green, pinnate leaves, of two leaflets, broadly oval, pointed, two inches long; bears, during the hot months, a vast profusion of flowers, in

form and colour similar to those of an Allamanda, with a tube two inches long, expanding at the mouth into five lobes, three inches across. During the time that it is in blossom a plant of extraordinary beauty.

4. **B. incarnata.**—A climbing woody shrub, with smooth, rather leathery, lanceolate leaves, three to four inches long, bears flowers similar to the last in size and form, of pale lilac colour, striped with deep purple; produced in great profusion in the hot months, and presenting a remarkably handsome effect upon the Bay leaf-like foliage.

5. **B. venusta**; *syn.* **Chirere.**—A climbing shrub, spreading over a vast space where room is afforded it. The foliage consists of pairs of pinnate leaves along the stem, of two heart-shaped, pointed, dull-green leaflets, three inches long. From the axil of each leaf is borne a crowded drooping corymb of tubular vermilion-coloured flowers, two inches long; blooming in January and February in such exuberant profusion as to cover the entire surface of the plant with a carpet of colour. Probably no plant in the world presents a more truly gorgeous appearance than it does then.

6. **B. undulata**—Is described as a tree with drooping branchlets like those of the Weeping-willow, and bearing in March small racemes of very large, erect, inodorous, orange-coloured flowers. "When in flower," Dr. Roxburgh says, "one of the most beautiful small trees I have seen."

7. **B. quadrilocularis.**—A large tree, blossoms at the beginning of the hot season, with large erect panicles of many-flowered, large, rose-coloured, delightfully fragrant flowers.

8. **B. amœna.**—A small handsome tree, with cheerful foliage of narrowly-lanceolate dark-green leaves, two inches long; produces in the hot season numerous funnel-shaped, large yellow flowers, with mouth expanding into five orange-coloured lobes.

9. **B. picta** and 10. **B. Roezleana** are of late introduction.

10. **B. magnifica.**—Native of the United States of Columbia, and recently introduced, with handsome leaves, marked somewhat like Cissus discolor, and bearing very large flowers of a delicate mauve at opening, which change to rich crimson, with a throat of a light primrose colour; perhaps the loveliest **bignonia** in cultivation. It is a very prolific bloomer.

11. **G. grandiflora** and 12. **B. radicans** bear dull red flowers very similar to each other.

13. **B. aurantiaca.**—Bears large orange-red flowers. An extensive climber.

14. **B. excelsa** and 15. **B. ornata** are recent introductions. So is 16. **B. violacea,** which bears lovely violet-coloured flowers.

Frederika (Fredericia ?)

F. Guillaumi.—A new creeper recently introduced.

Millingtonia.

M. hortensis.—A lofty tree, with exceedingly beautiful foliage of deep-green decompound leaves, looking remarkably handsome in the cold season, when in blossom, with its numberless panicles of large, pure white, fragrant flowers. A common forest tree, and one, as Dr. Roxburgh well remarks, adapted for avenues and plantations. Propagated by seed in February.

Amphilophium.

A. Mutisii.—A climbing shrub of most extensive growth, making its way to the summit of the loftiest trees. Far from being an ornamental plant, except for the flowers it occasionally produces in October, which are large, of a fine purple colour, and, from the manner in which they are borne, somewhat resemble great clusters of grapes.

Spathodea.

1. **S. uncinata.**—An extensively-spreading climbing shrub, with very slender stems and dense foliage of opposite pinnate leaves; leaflets narrowly heart-shaped, an inch long; bears in the hot season numerous pale livid-red flowers, neither large nor very interesting. Propagated by cuttings in the rains.

2. **S. serrulata.**—A high tree, bears in May, in great profusion, drooping creamy-white flowers of extinguisher form seven inches long. Propagated by cuttings in the rains.

Tecoma.

1. **T. grandiflora.**—A handsome climbing shrub, with graceful spray-like foliage of bipinnate leaves; leaflets seven, roundish, saw-edged, about three-quarters of an inch long. Trained up a high pole, surmounted by two short cross-beams in the manner of a turnstile, it will let fall its great drooping clusters of large orange-coloured flowers in a very beautiful way during the hot months. It sheds its leaves in the cold season, when it should be well cut in, and the numerous suckers it sends up all around be removed, and some enriched soil be given to the roots. The suckers will afford a supply of fresh young plants. It bears seed abundantly in November.

2. **T. radicans.**—A small shrub, three or four feet high, of most graceful foliage, similar to that of the last, but of smaller character and more dense and verdant; of sprawling habit, emitting roots from its branches wherever they touch the ground; constantly in blossom, with a profusion of drooping corymbs of orange-scarlet tubular flowers an inch-and-a-quarter long. Propagated by cuttings in November.

3. **T. jasminoides.**—A scandent shrub, with bright, dark green pinnate foliage; leaflets five to seven, smooth, shining, narrowly-oval, pointed; certainly one of the most beautiful plants of the garden; continually in blossom with corymbs of large, rosy-white, much-expanded flowers, with dark-purple centre. Propagated readily by cuttings in the rains.

4. **T. stans.**—A small tree, six to eight feet high, of remarkably graceful foliage of pinnate leaves: leaflets from seven to eleven, three or four inches long, much slashed and notched; when in full blossom, as in the vicinity of Calcutta, it nearly always is a most beautiful plant. Flowers very large, funnel-shaped, with wide-expanded mouth, golden-yellow. It is killed by the cold season in the Upper Provinces, but seeds sown there in March produce plants which blossom beautifully in October.

5. **T. apiifolia.**—A variety of the last, with parsley-like foliage, is met with in the Calcutta Botanical Gardens.

6. **T. velutina.**—A handsome plant of the same size as the last, and with very similar flowers; leaflets lanceolate, five inches long, saw-edged, and not deeply cut.

Eccremocarpus.

E. scaber.—A beautiful, slender, climbing shrub, bears middling-sized, tubular, pale-red flowers, grows freely at Ootacamund; but I have never seen it in the plains. I have many times sown the seed, but it has never germinated.

ACANTHACEÆ.

In plants of this order our Indian gardens are rather rich. They are for the most part easy of culture, and are propagated readily from cuttings during the rains. All require very much the same mode of treatment; that is to say, frequent renewal, transplantation to fresh soil every year or so, and close cutting in when the flowering season is over; otherwise they soon come to look unsightly.

In Vol. I, New Series, of the 'Journal of the Agri-Horticultural Society,' is a descriptive and classified list of all the plants of this order

cultivated in the Botanical Gardens by Dr. T. Anderson, at the conclusion of which are the valuable remarks I take leave to subjoin :—

„ Until recently all the Acanthaceæ have been cultivated in the open ground, generally in the flower borders of the garden, where the soil is kept open. Under this treatment many of the species grow vigorously, and afford in their season of bloom some of the gayest ornaments of the Indian flower garden; but there are many other lovely species, and especially those which inhabit the cool mountain forests of the Himalaya, the Khassia Hills, Ceylon, and Java, with some delicate American species which have been kept alive with difficulty. The dry atmosphere and scorching sun prevailing during March, April, and May are most pernicious to these plants, and, excepting perhaps moisture stagnant about their roots, are the worst conditions in which they could be placed. Shade-loving species of Acanthaceæ have, however lately been removed to a cool house, like those adopted here for the cultivation of Orchids and Ferns. In such structures these delicate Acanthaceæ have grown with a surprising vigour, and have become a mass of beautiful luxuriant foliage, and many of them have already blossomed as freely as in their native forests.

"Some of the Ruellia and the allied genera Stephanophysum and Stemonacanthus, nearly all the Strobilanthi, some of the Dædalacanthi, all the Aphelandreæ, Cyrtanthera, Beloperone, the American Justiciæ, several of the Eranthema, and five species of Thyrsacanthus thrive under shelter; while exposed in open borders some of them barely exist, and scarcely ever flower."

Thunbergia.

1. **T. fragrans.**—An herbaceous climbing plant, with slender stems and rough, small, heart-shaped leaves; bears nearly always beautiful snow-white flowers of the size of a rupee; very ornamental grown in a pot. Propagated from seed which it bears in abundance. Contrary to what the name would seem to denote, the flowers have no fragrance whatever.

2. **T. grandiflora.**—A most extensive climbing shrub, with heart-formed leaves; grows to the summit of the loftiest trees, covering them with a curtain of foliage so dense as, when seen from a distance, to present the appearance of some ivy-clad ruin. It may, however by training and close pruning, be made to blossom beautifully of a small size: bears very large, pale-blue, widely-expanded flowers at all seasons, but principally in the cold weather. Propagated by layers and cuttings.

3. **T. laurifolia.**—A large climbing shrub, native of Burma; bears flowers hardly to be recognized from those of the preceding, but quite different foliage, the leaves being of a long, lanceolate, tapering form, nine inches long: when trained over a wall or trellis, the profusion of large flowers, two-and-a-half inches across, of the palest lavender

colour, which it bears makes it a truly delightful object during the cold season. Yields seed abundantly.

Meyenia.

1. **M. Hawtayneana.**—A neat, pretty, climbing plant, with slender thread-like stems, and very rigid heart-shaped leaves, an inch-and-a-half long; bears, at nearly all seasons, large azure-blue flowers, with a white tube; a native of the Nilgherries, and rather delicate in the plains, where it is very apt to die off; succeeds better in the open ground than in a pot, and should be planted in a shady spot; seeds abundantly in the cold weather, from which plants can be easily raised.

There is likewise a white variety.

2. **M. erecta.**—A dwarf woody shrub, two or three feet high, with smooth, myrtle-like, oval leaves, the stems and young shoots of a deep purple colour; bears principally in the cold season large, beautiful, gloxinia-like, azure-blue flowers, with pale-yellow tube. This charming plant, introduced from Kew in 1859, thrives here so well, and is so easily propagated, that it has now become one of the commonest ornaments of the Calcutta gardens. There is a variety with white flowers, but the blue is much the handsomer. Propagated by cuttings in the rains; produces abundance of seed in the cold season.

Hexacentris.

H. coccinea.—An extensively-climbing shrub; ornamental if kept within bounds; has curious parallel-nerved, narrow, heart-shaped leaves, about four inches long: bears moderate-sized flowers of singular form, and of yellow and dull orange-red colour in the cold season. Propagated by layers and cuttings in the cold months.

Henfreya.

H. scandens.—A shrub of moderate size, native of Sierra Leone, with smooth lanceolate leaves five inches long; bears in March large, white, handsome, thimble-formed flowers. Propagated by cuttings in the rains.

Dipteracanthus.

D. ciliatus.—An exceedingly charming small prostrate-growing shrub, with oval, pointed, hoary leaves, two inches long; blossoms in

September with beautiful, large, thimble-formed, pure azure-blue flowers with a white tube. Propagated by cuttings in the rains.

Petalidium.

P. barlerioides.—A very pretty small shrub, with round smooth leaves; bears in February and March a profusion of bunches of large, white, thimble-formed flowers. Propagated by cuttings in the rains.

Stephanophysum.

1. **S. repens.**—A small herbaceous plant; bears nearly always heads of vivid scarlet flowers, an inch-and-a-half long, of a horn-like form with gaping mouth, sparkling and pretty.
2. **S. Baikiei.**—A remarkably beautiful plant, about two feet high, with wavy, oblong, pointed leaves; bears in the cold season heads of numerous large, tubular, heath-like, deep-crimson red flowers, about two inches long. A profuse bloomer.
3. S. **longifolium.**—Is a recent introduction. Both propagated by cuttings in the rains.

Strobilanthes.

1. **S. scabra.**—An exceedingly pretty small shrub when, in March, it bears in great profusion its clusters of small thimble-formed, sulphur-coloured flowers. This and the following can be easily increased by cutting in the rains.
2. **S. auriculata.**—A small plant of rather coarse appearance, but very handsome while bearing its numerous heads of pale lilac, thimble-formed flowers in the cold season.
3. **S. Sabiniana.**—A small shrub, two feet high, remarkable for its large deep-green, pointed oval, saw-edged leaves, from two to four inches long, with their under surface of a purplish-red colour; bears large lilac flowers in the cold season.
4. **S. maculata,** *olim* **Ruellia.**—A small herbaceous plant; when in vigour very ornamental for the double row of blotches of silvery film upon each of its large, smooth, glossy, deep-green, lanceolate leaves, three or four inches long. Dr. Anderson remarks: "The silvery white spots on the leaves, so beautifully marked in its native forests, are seldom well developed in Calcutta."
5. **S. tomentosa.**—A small, not very ornamental, plant, with densely woolly stem and leaves.
6. **L. sessilis.**—Native of Bombay; described in Curtis as bearing large handsome blue-rimmed flowers with lilac tube.

Goldfussia.

1. **G. colorata.**—A handsome small shrub, three feet high, with oval, taper-pointed, saw-edged, deep green leaves, which, while it is in blossom, from December to March, contrast well with its sprays of gay crimson bell-like flowers.

2. **G. isophylla.**—A very cheerful and delightful little bushy plant, about two feet high, with dark willow-like leaves; blossoms in the shade in the cold season, with an unlimited profusion of pale-blue flowers, like those of the Harebell Campanula.

3. **G. anisophylla.**—Differs imperceptibly from the preceding, except in having its pairs of leaves of unequal size and its flowers a little larger.

4. **G. glomerata.**—A dwarf rather prostrate shrub, with hoary green leaves, which contrast finely with the beautiful large, deep azure-blue flowers, with swollen white tubes, that it bears in the cold season.

5. **G. lamiifolia.**—A very pretty small slender trailing plant; bears in the cold season numerous little pale-lilac thimble-formed flowers.

6. **G. devaricata.**—Dr. Anderson describes as a large shrubby species from the temperate forests of Nepal, bearing large snowy-white flowers with a dark brown spot on the inside of the tube of the corolla: plants die after ripening their seed.

7. **G. rubescens.**—Dr. Anderson says: "A native of the sub-temperate forests of Sikkim: a beautiful species, producing a profusion of large blue flowers once only in its lifetime."

All the above can be propagated by seed sown in October, also by cuttings in sand put down in November, on the plains.

Dædalacanthus.

D. splendens.—Dr. Anderson says: "A very handsome species." The segments of the corolla change to a dark cinnabar colour on the opening of the flower. Propagated by seed and cuttings in October and November on the plains.

Asystasia.

1. **A. formosa.**—A truly lovely small herbaceous plant, produces large handsome, bright-scarlet, tubular blossoms in constant succession all the year round nearly, rather delicate, should be grown in a pot and kept somewhat in the shade.

2. **A. coromandeliana.**—A trailing plant of weedy and untidy habit, grows in the shade, and overruns the ground in a very short

time; bears numerous pretty thimble-formed pale-purple flowers, with light straw-coloured tube.

3. **A. Africana.**—Flowers almost pure white, produced nearly throughout the year.

All the above can be raised by seed in October on the plains.

Barleria.

1. **B. buxifolia**—A dwarf, woody, prickly, weedy, kind of plant; bears in the cold season small, white, bell-formed flowers of little interest.

2. **B. ciliata.**—A very ornamental bushy shrub, about three feet high; blossoms in the cold season with numerous rather large, bright, pale-blue flowers.

3. **B. cristata.**—A handsome bushy shrub, three feet high, bears in September and October a profusion of fine azure-blue flowers.

4. **B. dichotoma.**—Exactly like the preceding, except that it bears white flowers in September.

5. **B. Gibsoni.**—A bushy shrub, about three feet high, with smooth, pointed, lanceolate leaves, four inches long, by far the most showy of all the Barlerias, and a splendid ornament in the cold season, when it puts forth its constant succession of bright azure-blue flowers, three or four times larger than those of any other species.

6. **B. lupulina.**—A small thorny plant, with the long, narrow-glossy leaves prettily marked with their red midrib; bears small straw-coloured flowers on great, chocolate-brown wheat-ear-like heads; curious, but not very ornamental.

7. **B. rosea.**—A small shrub, very beautiful in the cold season when bearing its profusion of rose-coloured blossoms.

8. **B. sp.**—From Mauritius, somewhat similar to the preceding, but of larger growth; a splendid object in November and December, when it becomes one complete mass of rose-coloured blossom.

9. **B. prionitis.**—A small thorny shrub, about two feet high, a common weed of this country, bears pale nankeen flowers, which have a pretty appearance upon the deep-green verdant leaves when the plant is in good condition.

10. **B. cærulea.**—A small not very pleasing plant, bears azure-blue and rather pretty flowers, but on great ugly heads of compressed bracts.

11. **B. hirsuta.**—An agreeable shrub when in blossom with its bright azure-blue flowers.

12. **B. montana.**—A pretty plant, with deep-green leaves shot with purple: flowers pale rose-colour.

All the above can be propagated by cuttings in October and November on the plains.

Geissomeria.

G. aurantiaca.—A very handsome shrub, three feet high, with large, thick, glossy laurel-like leaves; bears in February and March blossom-heads of bright vermilion tubular flowers an inch long, requires to be kept in a shady situation, or the leaves lose their fine verdant appearance. Propagated by cuttings put down in October and November on the plains.

Gymnostachyum.

[FITTONIA.]

G. Zeylanicum gigantea, Pearcei and **argyroneusa.**—Lovely little plants with variegated leaves, natives of the shady forests of Ceylon. Under the name of Fittonia are given some two or three other species of low trailing habit, ornamental for the pink or white veins of their leaves. Admirably suited for covering rockeries and for hanging baskets. They propagate themselves by the trailing branches taking root wherever they touch. Old mortar or concrete suits them best, in which they thrive to great perfection. They are at their best during the rains.

Acanthus.

A. ilicifolius.—*Hurkut.*—A shrub, about three feet high, curious for the perfect resemblance its prickly leaves bear to those of the Holly; produces in April and May large sky-blue flowers, somewhat like those of the blue Iris; may be seen growing wild in wet ditches about Howrah. If grown in a pot, the latter should be kept submerged in water, as then the plants thrive best. Propagated by division and seed.

Crossadra.

C. infundibuliformis.—A small shrub two or three feet high, with lanceolate, taper-pointed leaves, three or four inches long; bears largish orange-yellow flowers, upon wheat-ear-like heads, in uninterrupted succession from March to November.

There is a variety with orange-scarlet coloured flowers. Propagated by seed and cuttings in the rains.

Aphelandra.

1. **A. cristata.**—A noble-looking shrub, three feet high, with lanceolate, taper-pointed leaves, seven or eight inches long, bears in March, on the summits of the stems, crowds of quadrangular spikes of brilliant-scarlet flowers.

2. **A. fulgens.**—In general character not very dissimilar to the last, but has smaller leaves; blossoms in the cold season, and produces much larger flowers.

3. **A. tetragona.**—A plant of extraordinary beauty when in full blossom; bears densely-set vermilion-coloured flowers along the edges of the long cube-formed ears. Of dwarf habit, with rich foliage of lanceolate, taper-pointed, wavy leaves.

All the above are propagated by cuttings in the rains.

Phlogacanthus.

P. thyrsiflorus.—A large shrub, from six to ten feet high, with handsome, laurel-like, very verdant leaves; bears in January and February, in great profusion, long crowded spikes of large tawny-brown flowers; much commended for its beauty by Roxburgh. Propagated by cuttings in the rains.

Graptophyllum.

1. **G. hortense.**—A shrub of moderate size, with large, oval, pointed leaves, six inches long, of a dull deep-green above and of a dark-red on the under surface; useful placed as a screen to keep out of view anything unsightly, as well as a fine foil to flowering plants in front of it. *Var.* **G. pictum.**—CARICATURE PLANT.—A large shrub with remarkably beautiful foliage, the leaves being large, heart-shaped, of a fine pure green, mottled with blotches of creamy-white; interesting also for the pretty pink flowers it bears. Propagated by cuttings in the rains.

Cyrtanthera.

1. **C. Pohliana.**—A small plant with pointed oval leaves three inches long; bears in the cold season crowded heads of rose-coloured, long, tubular flowers, ending in long gaping lobes with long projecting stamens: rather pretty.

2. **C. aurantiaca.**—Flowers Aphelandra-like, large, handsome. Propagated by cuttings in the rains.

Adhatoda.

A. cydoniæfolia.—A most beautiful shrub, native of Brazil; bears in the axils of the leaves large flowers, with the upper lip white, spotted with purple at the top; the lower deep-purple with a yellow ray down the middle. **A. cœnea** is a recent introduction. Propagated by cuttings in the rains.

Beloperone.

1. **B. oblongata.**—A handsome small plant, nearly always in blossom, with large purplish-crimson flowers.
2. **B. nervosa.**—Of larger habit than the last, with larger leaves, flowers pink.
3. **B. verrucosa.**—A small plant, with pink flowers not unlike those of a dead-nettle. All the foregoing propagated by cuttings in the rains.

Eranthemum.

1. **E. bicolor.**—A small plant, very beautiful when in full blossom, as it nearly always is, except in the cold season, with its rather small, pure white-sparkling flowers, with a dark-puce spot on the under lip.
2. **E. crenulatum.**—A small shrub, bears in the cold season pure white flowers, prettily pencilled with puce-coloured markings.
3. **E. erectum**—A plant, about three feet high, with small narrow leaves; bears in the cold season flowers of a most beautiful blue with dark eye.
4. **E. nervosum,** *syn.* **Dædalacanthus.**—A large bush, with large blackish-green leaves; of extraordinary beauty when in full bloom in February, with its profusion of deep azure-blue flowers on large prettily-pencilled ears. *Var.* **E. pulchellum.**—Bears flowers in March, similar, but of a paler blue.
5. **E. strictum.**—Bears flowers much like those of **E. erectum,** but with a light eye, and has much larger leaves.
6. **E. grandifolium.**—A plant of straggling habit with pale-blue flowers.
7. **E. racemosum**—A small under-shrub of great beauty, native of Moluccas, with oblong leaves; bears in November large pretty flowers, pale, pink, or white tinged with red.
8. **E. blumei.**
9. **E. cinnabarinum.**—From the Tenasserim forests; bears large conspicuous flowers.

10. **E. igneum.**—Lately introduced.

The following are the more recent introductions, and are all remarkable both for the beauty of their leaves as well as their flowers :—

11. **E. albo marginata,** the leaves being margined with white; 12. **E. argenteum,** the leaves of a silvery hue. 13. **E. Cooperii;** 14. **E. Eldorado;** 15. **E. macrophylla variegata,** with noble-looking variegated leaves. 16. **E. moorei;** 17. **E. nigrescens;** 18. **E. nobilis;** 19. **E. roseum;** 20. **E. salicifolium,** with drooping, willow-like leaves; and 21. **E. tricolor.**

The above are all easily propagated by cuttings in sand during the rains; also by division in many cases.

Justicia.

A genus of plants very closely allied to Eranthemum, from which it is difficult to distinguish them.

1. **J. Betonica.**—A small herbaceous plant, remarkable principally for the beautiful pencilling of the ears on which the flowers are borne.

2. **J. calycotricha,** *syn.* **Thyrsacanthus.**—A small, delicate plant, very pretty when in bloom in the cold season, with its close heads of pale-lemon flowers.

3. **J. carnea.**—A very choice and handsome plant, two or three feet high; bears in the cold season large, gaping, rose-coloured flowers in great clustered heads.

4. **J. coccinea,** *syn.* **Thyrsacanthus.**—A shrub, three or four feet high, with large, handsome oval leaves, as much as ten inches long, of a dark bright-green, relieving beautifully the brilliant, crimson-scarlet, tubular flowers, two inches long, borne on densely crowded spikes. In a good soil apt to be troublesome from the numerous suckers it throws up around.

5. **J. Gendarussa.**—Bears flowers of moderate size, dirty-white, and of little beauty.

6. **J. grandifolia.**—A handsome-foliaged plant with delicate flowers; from the Tenasserim forests.

7. **J. rutilans,** *syn.* **Thyrsacanthus.**—Flowers scarlet.

8. **J. argenteea;** 9. **J. mannorata;** and 10. **J. zebrina,** are recent introductions.

Peristrophe.

1. **P. tinctoria**—A pretty, simple little plant, two feet high; bears in the cold season unpretending flowers, consisting merely of two pale-pink, narrow, strap-like lobes.

2. **P. speciosa.**—Very similar to the foregoing, except that the flowers are of somewhat larger size. Roxburgh says of it: "A native of Bengal, where it blossoms in the cold season, and is one of the greatest ornaments of the forests."

3. **P. angustifolia aureo variegata.**—One of the prettiest of the species.

All the above are propagated by cuttings in the rains.

Sanchezia.

S. nobilis.—Native of Ecuador, of late introduction, described as resembling an Aphelandra; an abundant bloomer, with large dense terminal panicles of bright yellow tubular flowers set in broad crimson bracts: a magnificent object when in bloom. There is also a variety with variegated leaves. Propagated by cuttings in the rains.

Fittonia.

Trailing plants with brilliantly-marked leaves. They love the shade, and are suited only for cultivation in the Betel-house. See **Gynastachyum.**

SCROPHULARIACEÆ.

Brunsfelsia.

1. **B. Americana.**—An erect growing shrub, six feet in height, with lanceolate, dull yellowish-green leaves; not ornamental, except in October and March, when in full blossom; flowers produced in great profusion, very large, in form somewhat like those of a Petunia, pure-white at first, becoming on the next day of a beautiful primrose-colour; yields seed in the cold season, somewhat resembling Holly-berries, from which it may be propagated as well as from layers.

2. **B. undulata.**—A shrub of about the same size as the last, but of a more spreading habit, and with wavy leaves; produces very similar flowers, and bears in March round seed-pods, like those of the Wood-apple, of the size of a small lime.

3. **B. montana.**—A small shrub, with long narrow, lanceolate leaves.

4. **B. Cubensis.**—A shrub with neat foliage of shining lanceolate leaves; and 5. **B. erecta.**—All the above are easily increased by cuttings in the rains.

Franciscea.

A genus of exceedingly ornamental flowering under-shrubs, natives of Peru and Brazil, where they are found growing in the shady parts of forests. A light pervious soil, containing a liberal supply of leaf-mould and some sand, suits them best. Propagated by layers.

1. **F. latifolia.**—A small not uncommon shrub; one of the most lovely plants our gardens contain; has soft oval leaves of a most verdant refreshing green, which it sheds in the cold weather, but by the end of February puts forth again, producing at the same time numerous exquisitely-fragrant flowers of flattened form, of about the size of a rupee, at first of a fine deep-blue, subsequently changing to pure-white; blossoms also in July. It is usual to cultivate it in large pots, though it may be grown in the border.

2. **F. eximia.**—It is stated that "in Belgium this is spoken of as the finest species of the genus yet in cultivation." It is met with in Calcutta, but is not common; a somewhat erect-growing shrub, three or four feet in height, with lanceolate leaves, tapering to a sharp point, from three to six inches long, of a dull opaque-green colour; and with downy branches. Blossoms in February profusely, with flowers very similar to those of the last.

3. **F. uniflora (F. Hopeana ?)**—Very similar to the two foregoing, but with smaller leaves; flowers somewhat smaller, borne one on a footstalk, in February and March, presenting a perfect mass of lovely blossom, pure-white or deep-blue, according to the time they have opened, mingling together with delightful effect, and emitting a most agreeable perfume. Its main detraction is that it is rather bare of foliage at the time.

4. **F. confertiflora.**—A handsome shrub, with oval leaves, three or four inches long; bears crowded cymes of beautiful lilac flowers; a rare plant here, not succeeding well, I believe, in the climate, but does well in the grass conservatories.

5. **F. hydrangeæformis.**—Remarkable for the largeness of its leaves, and its close heads of purple flowers; has not been cultivated with success in the open, but does well in the grass conservatory.

6. **F. Lindeni.**—Is a recent introduction, and is rather uncommon.

Calceolaria.

The attempt to introduce into this country, on the plains, any of the beautiful plants of this genus I believe to be perfectly hopeless. Good thriving seedlings may be easily raised during the cold season, but will be sure to perish upon the first approach of the hot weather. I noticed plants in the gardens at Ootacamund, but they seemed to thrive very

indifferently even there. On the hills, in the Himalaya ranges, however, they are cultivated with great success. The seed should be sown in March on the hills, and the seedlings potted singly, shifting them into larger pots as they grow. Shade is necessary for them.

Angelonia.

A. grandiflora.—A small herbaceous, not a very pleasing plant, about two feet high; bears nearly all the year long spikes of numerous small, blue, gaping flowers, with a strong, disagreeable scent, which some, however, have considered to resemble that of the Pine-apple; plants require to be often renewed, or soon grow to look old and unsightly. Propagated by cuttings in the rains.

Antirrhinum.

A. majus—SNAPDRAGON.—The seed of this handsome and familiar herbaceous plant is usually sown in October on the plains, and in March on the hills. The variety and beauty of the flowers will, of course, depend upon the seed. The plants will blossom in March, but they do so more handsomely, I think, from being preserved until the following cold season, before flowering.

Maurandya.

M. Barclayana.—A lovely creeping plant of slender habit and graceful foliage; requires to be trained on a light trellis, and is best adapted for growing in pots to decorate the verandah; flowers snap-dragon-like, of several varieties of colour, dark-purple, rose, and nearly white; constantly in blossom. Seeds, sown as usual with the annuals in October, produce plants that blossom in three or four months' time. There are two or three other species of Maurandya, but none at all equal in merit to this.

Lophospermum.

L. scandens.—A very handsome herbaceous creeper; requires a large extent of trellis for its support; flowers large, very similar to those of the Foxglove, but more delicate, of a beautiful rose-colour; plants raised from seed in October, and kept through the hot weather till the next cold season, blossom in great beauty in February; they require a great deal of pot-room, and a rich and well-watered soil. Sow the seed in March on the hills.

Pentstemon.

Herbaceous plants, about two feet high, producing erect spikes of pretty flowers of various colours, tubular or bell-formed, like those of Angelonia but larger, some, it is said, as large as those of the Lophospermum; plants raised from seed sown with the annuals in October will continue in blossom during the hot and rain seasons following. May be propagated by division of the roots or by cuttings.

English seedsmen offer seeds of several species bearing scarlet, blue, yellow, and other coloured flowers; but the largest and finest flowers are produced from hybrids with fancy names, which, if desired, must be imported from some nurseryman: and many possibly might be thought well worth it. Sow the seed in March on the hills.

Tetranema.

T. Mexicana.—A small pot-plant, half a foot high; in habit of growth somewhat resembling the Primrose; nearly perpetually in blossom with crowded umbels of small, gaping, pale-lilac flowers; a perfect little gem, quite the ornament of the verandah, where it should be always kept, under shelter from sun and rain; requires to be renewed every year; produces abundance of seed, which should be sown as soon as gathered, is as fine as dust, and takes a month or two in germinating. A pane of glass should be kept over the pot in which the seed is sown, to prevent the earth from drying too soon. The plants require a light vegetable soil, and perfect drainage.

Russellia.

1. **R. juncea.**—A very common, but an exceedingly beautiful, bushy plant about three or four feet high; perpetually in full blossom, with tubular bright scarlet flowers, half-an-inch long, borne in great profusion on its long rush-like stems. In England it is not unfrequently grown suspended in baskets, over which the drooping flower-loaded branches have a very delightful appearance. Plants, however, thus treated in this country would require constant attention that the soil be not allowed to dry up through want of watering. Every portion of it that touches the ground in the rains takes root. I had in my garden several plants growing out of the crevices of a north wall which had rooted themselves there from a plant that happened to be leaning against it in the rainy season. These had a very curious and interesting appearance.

2. **R. floribunda.**—A very handsome plant, bearing little similarity in general appearance to the preceding; flowers not large, crimson

scarlet, borne in crowded bunches along and on the summit of the stem, in great profusion, at all seasons. Propagated by division.

Torenia.

1. **T. Asiatica.**—Called sometimes Syspara creeper, from being a native of that locality in the Nilgherries; an extremely beautiful herbaceous pot-plant; flowers small, bell-formed, pale purple, with a large blotch of dark clear purple on the lower lobe, sparkling like enamel; best renewed annually from seed sown in March, both on the plains and on the hills. The plants thrive well in the shade, with their pots constantly immersed in pans of water, and blossom in great beauty in September.

2. **T. sp.**—A plant resembling the foregoing, but far inferior to it, the flowers being devoid of the fine deep purple blotch on the lower lobe.

Buddlea.

1. **B. Lindleyana.**—A very ornamental shrub, growing to the height of six feet; introduced from Chusan by Mr. Fortune; flowers small, but very numerous, pale pink or rich violet, borne densely upon racemes of blossom, four to six inches long, in unlimited profusion all the warmer months; requires to be well cut in, in November. Propagated easily by cuttings put down in November after pruning.

2. **B. Neemda.**—Sir J. Paxton says of this: "One of the most beautiful plants of India." A shrub of small growth; flowers milk-white, borne densely on long narrow spikes in January. Propagated by cuttings.

3. **B. Madagascarensis.**—A large shrub of very rampant growth, fit only for the shrubbery or outskirts of the garden; produces its flowers in January, small, of a bright pale orange colour, borne in long, loose, drooping clusters, beautiful to look upon, and emitting a honey-like fragrance; should be cut in severely after flowering. Propagated by cuttings.

4. **B. paniculata.**—A shrub of little merit, with white flowers.

5. **B. globosa.**—This beautiful plant, so common in the English gardens, with its balls of orange-coloured blossoms, has not, I believe, found its way to India.

Digitalis.

FOXGLOVE.

The attempt to cultivate this well-known plant on the plains of India has never, I believe, proved successful. But on the hills they are found growing wild. Need no care there. Sow the seed in March.

CAMPANULACEÆ.

Campanula.

BELL-FLOWER.

The perennial Campanulas are very numerous, including among them the old familiar Canterbury Bell and Chimney Campanula. Young plants raised from seed sown in October and kept under shelter till the following cold season, and then repotted in fresh soil, may chance to come into blossom; but in the vicinity of Calcutta they rarely do so. Dr. Voigt mentions as many as thirteen herbaceous species blossoming in the Calcutta gardens during the month of June. Not one of these, I believe, is to be met with there now. On the hills they succeed perfectly. The seed should be sown in March, and the seedling pricked out into pots three apiece.

C. Lychnitis.—An exceedingly pretty and not uncommon pot-plant; bears at nearly all seasons erect spikes, a foot-and-a-half high, of large bright-blue bell-like flowers. Easily multiplied by division of the roots.

LOBELIACEÆ.

Lobelia.

An extensive genus of herbaceous plants, some of great beauty; we have but one garden species, I believe, that lasts with us as a perennial.

C. radicans.—A small trailing plant, nearly always in blossom, with a profusion of small pale-violet flowers, having a pleasant bitter-almond-like fragrance.

Centropogon.

C. fastuosus.—An herbaceous pot-plant, bearing beautiful bright-crimson tubular flowers, half-an-inch long. Two or three specimens were in the conservatory of the Agri-Horticultural Society a few years ago, but have since disappeared, unsuited possibly to the climate.

VALERIANACEÆ.

Nardostachys.

N. Jatamansi.—SPIKENARD of the ancients; a small, unattractive, herbaceous pot-plant, native of the Himalayas, and rare in Calcutta;

bears small dirty-white flowers in March, on a long erect spike, in much repute for their fragrance. Raised from seed sown in October.

DIPSACEÆ.

Scabiosa.

SCABIOUS.

Plants of these herbaceous perennials, raised from seed in October, may be preserved till the following October; reported then they will put forth their handsome dark-purple knob-like heads of blossom during the cold season. Sow the seed in March on the hills.

ASTERACEÆ.

Eupatorium.

1. **Eu. asperum.**—A small herbaceous plant, tolerably pleasing when in blossom with its numerous groundsel-like dull-purple flowers.
2. **Eu. fœniculaceum.**—A plant somewhat similar to the preceding, but of smaller habit, and with pale-lavender smaller flowers.
3. **Eu. odoratum.**—A very pretty small shrub, each of its blossoming rods having in September and October a delicate feather-grass-like appearance, with exceedingly small, densely numerous, very fragrant flowers. Propagated by division of root or by seed.
4. **Eu. sp.**—A small herbaceous pot-plant, unnamed, lately introduced into the Calcutta Botanical Garden; bears in March large handsome trusses of compactly-set, large, groundsel-like, lavender flowers; when in full blossom a very beautiful plant.

Aster.

1. **A. annuus.**—A small plant, produces in May, small unpretending, white daisy-like flowers, of little merit.
2. **A. sp.**—Name un-ascertained, an exceedingly common plant in the Calcutta Gardens; strongly resembles that figured in Curtis as A. Sikhimensis; very pretty when in blossom, as it nearly always is during the hot months, with flowers somewhat like those of the Michaelmas Daisy, but much larger and finer, borne in large heads about a foot from the ground. Easily multiplied by division of the roots.

Bellis.

B. perennis—DAISY.—Plants of the Daisy, raised from seed sown in October, will come into blossom the same season. The few that prove double should be preserved, and the rest thrown away. Those preserved should be potted in well-drained pots, and put in some place under shelter from the rains till the following October, when they should be turned out of their pots, separated at the roots into several small plants, and be then repotted, or put out in the border in good rich soil. They will blossom beautifully, thus treated, the second season. No plant deteriorates so much if not shifted frequently into fresh soil. On the Hills sow in March.

Solidago.

S. Canadensis—GOLDEN ROD.—As common a plant in the Calcutta gardens, and thrives equally well, as in those of England; well known for its long feather-head-like rods of small, bright yellow, densely-crowded flowers. Propagated by division.

Dahlia.

D. superflua.—Though the Dahlia thrives well and blooms freely on the plains of India, it very rarely produces those fine, handsome, fully-double flowers which make it so conspicuous an object of beauty in the gardens of Europe and on the Hills.

The following will perhaps be found the most advisable mode of cultivation on the plains. About July the tubers begin to start. They should then be just covered over with some light mellow soil and watered. When they have made shoots about two inches long, take them up and slice off each shoot with a penknife, together with a small piece of the tuber. Plant out these shoots in a flower-pot filled with sand, and keep them watered. They will soon establish themselves as young plants. When they have done so, remove them into the pots or border where they are finally to remain, and they will blossom in November and December.

The great object to be aimed at is, by every retarding process that can be adopted, to prevent the plants from opening their flowers till about the middle of December. This must be obvious to any one who has observed how often the same plant that has commenced blossoming with all but single flowers in November will, as the cold season advances, produce them more and more double.

It is important that from an early period they be carefully supported with stakes, or they will be sure to be blown down and be destroyed.

About February, to facilitate the ripening of the tubers, discontinue watering. When the stems decay, cut them down to within an inch of the soil. Then take up the tubers carefully, so that the upper part of them, in which alone the eyes are situated, be not broken or injured. They should not be left exposed long to the air, or they will be apt to shrivel and perish; but as soon as they are quite dry they should be laid in a gumla, and be covered well over with dried earth and stored away in a godown.

"The buds or eyes," as Mrs. Loudon states, "are not scattered all over the tuber, like those of the Potato, but collected in a ring round the collar of the root, and when in a dry state are hardly perceptible. To discover them, nurserymen often plant the tubers in a hotbed 'to start the eyes.' Tubers are sometimes blind, and though put into the ground, and sending out abundance of fibrous roots for several years still never send up a shoot." The surest way of obtaining plants that produce fine flowers is to procure tubers from Europe. These however wear out, and become almost valueless after two or three seasons. Seed sown in October will produce plants which come into flower in February, of which one perhaps out of some twenty may be considered worth keeping, and the rest as only fit to be pulled up and thrown away.

No plant is more easy of propagation by cuttings than the Dahlia. The tips of shoots nipped off and planted in a flower-pot half full of river sand, with a pane of glass laid over it, will almost to a certainty all strike and soon form young plants.

On the Hills the tubers should be put down in May, and no further care or attention is needed as they come up and bloom to perfection. After flowering the tubers are usually left in the ground, but it is better to take them up and put them away in dry sand till the time comes round for putting them in the ground again.

Rudbeckia.

Herbaceous plants, bearing large, showy, but coarse-looking bright yellow, ox-eye daisy-like flowers. Best renewed from seed sown annually in October on the plains and in March on the Hills.

R. triloba.—A common weedy-looking plant, nearly always in blossom, with large yellow flowers, having a great ugly cone-shaped eye in the centre. Propagated by division.

Gaillardia.

G. picta.—An herbaceous perennial, of which there are several varieties; an invaluable ornament for the garden, enlivening it all the

hot and rainy seasons with numberless large, bright, marigold-formed, copperish-red and yellow flowers. Best renewed annually from seed.

Achillea.

1. **A. millefolium**—MILLEFOIL.—An herbaceous plant, always handsome for its graceful, divided, feather-like foliage; flowers rather small, very numerous, and of very long duration, pure-white, borne in large, compact, flattened heads. There is a variety with rose-coloured flowers. Propagated easily by division.

2. **A. nobilis.**—Also a handsome plant for its foilage, which, though quite distinct, somewhat resembles that of the last; flowers white.

Chrysanthemum.

1. **C. indicum.**—A common plant, native of this country, very showy, when in full blossom in November, with its profusion of bright, cheerful, golden-yellow, middle-sized flowers; does best in the open border, and requires little care bestowed upon it beyond removing it annually to fresh ground.

2. **C. sinense**—THE FLORIST'S CHRYSANTHEMUM—*Gool-dâudee*—*Chundro-moolik.*—Of this delightful plant, so well known and so universally cultivated, and which, during the months of November and December, makes our gardens so gay, most of the handsome varieties may, I believe, be now met with at Calcutta: the largest, somewhat smaller than a Dahlia, very double and pure-white; another somewhat smaller, of a clear brimstone colour; and numerous others of different colours and character, from the size of a China Aster to that of a Bachelor's Button, or a Chamomile-flower, including those called Pompones and Chusan Daisies, as well as the Japanese, with their comical flowers, resembling a Cockatoo's tuft much disordered. Some varieties are of a much more robust habit than others, and require little or no care to preserve them; while very many are almost sure to perish, unless great care be taken to shelter them from extremes of sunshine and rain. And all, like the Daisy, are certain rapidly to deteriorate unless removed from time to time into fresh soil.

The only choice kinds to be met with in India are imported ones. At Chinsurah I raised a great many plants from English seed, but without securing a single specimen worth preserving.

There are three classes into which the varieties of this plant are distributed:—1. The Incurved, such as have their petals curved up towards the centre. "Reflexed flowers, or those with their petals curving downwards," Mr. Dale says, "are now entirely rejected as show flowers." 2.—The anemone-flowered. 3.—Pompones.

The following is a list of what struck me as the largest and handsomest of those I saw in blossom in the Temple Gardens :—

Astrolabe, orange-nankeen ; Bella Donna, delicate lilac ; Beverley, ivory-white ; Cherub, golden amber ; Edwin Landseer, rosy ruby ; Florence Mary, very bright salmon-red ; Florence Nightingale, pale sulphur ; General Slade, Indian red, tipped with bright orange ; Globe, white ; Gloria mundi ; Golden Beverley ; Golden Nugget ; Hereward ; James Salter, a Japanese ; Golden Hermine, golden orange, tipped carmine ; Hermine, blush, tipped purple, Jardin des Plantes, bright golden orange ; Lady Russell, blush lilac ; Lady Slade, delicate lilac pink ; Nil Desperandum, dark red ; Nonpareil, rosy lilac ; Oliver Cromwell, dark chestnut ; Orlando, rosy buff ; Pelagia, bright orange cinnamon ; Prince Alfred ; Prince of Wales, bright fiery red ; Progne, crimson carmine ; Prometheus, bright fiery-red salmon ; Queen of England ; Vesta, ivory-white.

The best way of treating the plant, as far as my experience goes, seems to be this :—About the beginning of January, or directly the flowers fade and become unsightly, cut the flowering-stems close down. Turn the plant out of its pot, if it be in a pot, or if it be in the border dig it up. Remove the whole of the earth from its roots, and then pull it completely to pieces, by tearing apart each separate shoot and sucker. Prepare a piece of ground in a shady spot by digging it up and rendering it mellow with a mixture of old manure and a little sand. Put down the shoots and suckers in the manner of cuttings in rows a foot apart, and a foot between each shoot in the row. Water them daily, and they will soon establish themselves and grow with great vigour ; and by the end of May become large plants with numerous ground-shoots. They should then be taken up, and the shoots pulled apart at the roots, and each separate shoot planted singly in moderate-sized pots, in which they may remain under shelter from the heavy rains till October. They should then be repotted into ample-sized pots and a new soil. Some few left in the border will survive all extremes of weather, but the safer plan is to put all that room can be found for under shelter.

The Chrysanthemum is subject in the cold season to the ravages of a large white beetle-maggot, which preys upon the roots, and eats away the whole of their fibrous parts, thus eventually destroying it. When a plant under proper cultivation appears in a languishing state, it may often be referred to this cause, and it should be turned out of its pot, examined, and repotted in entirely fresh soil.

The Chrysanthemum is a coarse-feeding plant, and requires a good rich soil and abundance of water ; it is benefited by repeated applications of liquid manure, and also it is said of soap-suds.

Mr. Fortune has described the method of cultivation adopted by the Chinese which, he says, brings the plant to great perfection. One peculiarity in their treatment consists in a liberal use of night-soil

and in planting them at once in large pots. "The plants," he states, "are trained each with a single stem. This is forced to send out numerous laterals near its base. These are tied down in a neat and regular manner with a string of silken thread. By having the plants clothed with branches in this way, and by keeping the leaves in a green and healthy state, the specimens never have that bare and broom-headed appearance which they often present in England."*

To obtain unusually dwarf specimens, Sir J. Paxton says:—"Directly the flower-buds are formed, the tops of the shoots producing them are cut off at any desired length and planted in sandy loam. They will form adequate roots and flower as well as those not decapitated. We have them not more than six inches high."† This however is a proceeding, I believe, not always found successful, and is rarely resorted to. The specimens exhibited in the English shows have usually their stems from five to even seven feet high.

Artemisia.

1. **A. abrotanum**—SOUTHERNWOOD.—The old familiar shrub of our English gardens, so much used in bouquets for the agreeable fragrance of its leaves; not uncommon in the gardens of Calcutta, where however it attains only to a small size, and is generally grown in pots. Propagated by slips.

2. **A. lactifolia**—Sometimes misnamed **A. odoratissima**.—An herbaceous plant, at all times pleasing for the peculiar whitish hue of its foliage; continues in blossom all the cold weather, when a clump of it looks remarkably beautiful with its heads of densely-crowded, small, milk-white flowers, which in the heat of the day, diffuse a most delicious fragrance for some distance around. Easily propagated by division of roots.

Crossostephium.

C. artemisioides.—A curious dwarf shrub, remarkable for the strong vitriolic odour of its small whitish-green leaves; affords, on account of its very peculiar foliage, a pleasing variety among other pot-plants; bears a profusion of clumps of small, dingy yellow flowers. Propagated by seed, which it bears abundantly.

Cineraria.

It is utterly vain to attempt to cultivate the choice florists'-plants of this genus in the plains otherwise than as annuals in the cold season.

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* 'Tea Districts of China,' p. 124. † 'Bot. Mag. vii, p. 191.

Young plants may be raised from seed in October, some of which will come into blossom, though never very satisfactorily, just as the hot weather commences, after which time all are sure to perish. On the Hills, however, they grow to perfection. The seed should be sown in March, and the plants treated in the same way as Calceolarias.

Cacalia.

1. **C. carnosa.**—An herbaceous plant, a common weed in some parts of India, with fleshy leaves of a pallid green hue; flowers greenish-white, of no merit whatever.

2. **C. hieraceoides.**—An herbaceous plant; bears flowers not unlike those of the Sow-thistle, and not at all more interesting.

COMBRETACEÆ.

Poivrea.

1. **P. coccinea.**—A large climbing shrub with very slender stems; requires the support of a trellis; almost constantly in blossom with a profusion of small bright crimson flowers, borne in large compact brush-like bunches, beautifully relieved against the bright, cheerful, glossy green of the foliage. One of the handsomest and most prized ornaments of our Indian gardens. Propagated by layers, which usually take a long time before rooting. Mr. Mackintosh says that it should be grafted on Combretum Pinceanum, or some other free-growing species.

2. **Roxburghii.**—A powerful rambling shrub, overgrowing a great extent of space; bears in January brush-like trusses of dingy-white flowers of no attractiveness

3. **P. grandiflora.**—Bears flowers very similar to the first-named, only much larger.

Combretum.

Several species of this genus of noble scandent shrubs are now found commonly enough in the gardens about Calcutta; all those, however, of an ornamental kind are seemingly of recent introduction. They are apt to become rampant, and are benefited by being well cut in when the time of flowering is over, and bloom the better for it afterwards. They are propagated by layers, which are sometimes slow in rooting. Cuttings here do not succeed, and some difficulty in striking them appears to be met with in England likewise, for a writer in the 'Gardener's Chronicle' observes:—" This arises from not selecting fit pieces

for cuttings, for short-jointed firm bits of young wood, treated in the ordinary manner, root freely. These are easily obtained from pot-bound specimens." Some bear seed abundantly, from which plants may be readily raised, but these will take four or five years at least before coming into bloom.

Mr. Mackintosh says :—"As soon as the young wood has ripened, and the leaves begin to fall, the lateral shoots should be cut back to within one bud of the base, and if the spurs thus formed along the main stem become too crowded, they should be thinned out to a foot apart. By this means **C. grandiflorum** has been made to bloom, which is one of the shyest flowerers of the genus."*

1. **C. comosum.**—A large climbing shrub, admirably adapted for covering an arbour or archway; forms a delightful ornament during the cold season, when a perfect mass of bloom with its countless large, compact, brush-like clusters of bright-crimson flowers.

2. **C. rotundifolium.**—A large rambling shrub; bears dull white flowers, not at all interesting.

3. **C. grandiflorum.**—A rambling shrub, of very powerful habit; requires a vast deal of room, and a very robust support to grow upon; bears in November, in great profusion, trusses of fine deep-crimson flowers.

4. **C. macrophyllum.**—In every respect a truly noble plant; nothing can surpass it in magnificence and beauty when in full bloom in February and March; the very large, laurel-shaped, wavy, blackish-green leaves of themselves render the plant very handsome and desirable. It has the advantage also of being less rampant in growth than other species; flowers borne in moderate-sized brush-like bunches of the most vivid deep-carmine, admirably relieved by the dense, dark, grand foliage.

5. **C. pincianum.**—A shrub of considerable size, described by Sir J. Paxton as bearing "panicles of flowers a foot-and-a-half long of a red or purplish-red colour." With this description the plants so named in the Calcutta Botanical Gardens do not altogether correspond, as the flowers they produce are of a light vermilion or cinnabar colour. Blossoms in February, when almost leafless, becoming then an entire mass of bloom with its large compact sprays of numberless trusses of flowers.

6. **C. densiflorum.**—A noble scandent shrub, with large handsome leaves; bears fine trusses of beautiful crimson blossoms in the cold season.

7. **C. wightianum.** 8. **C. chinense.** 9. **C. acuminatum.**—These last three are large rambling shrubs, bearing whitish flowers, not sufficiently ornamental to entitle them to a place in the garden.

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* 'Book of the Garden,' vol. ii., p. 717.

Quisqualis.

Q. indica.—An extensively-growing scandent shrub, requires a strong trellis for its support: bears during the hot and rain seasons in constant succession, profuse clusters of deliciously fragrant flowers of middling size, at first white, but turning on the following day to a blood colour. This mixture of the two different-coloured flowers gives it a very charming appearance. In a good soil it becomes of very rampant growth, and is then rather unmanageable: should be well cut in in the cold season. Propagated by layers and cuttings during the rains.

ONAGRACEÆ.

Jussiæa.

J. villosa—PRIMROSE WILLOW.—Native of India. A shrubby herbaceous plant, two or three feet high; bears rather large, four-petalled, evening-primrose-like flowers, of a pale dull-yellow colour, not very ornamental. Propagated from seed, which it bears in abundance.

Œnothera.

Œ. drummondi—EVENING-PRIMROSE.—A very showy and beautiful species, and a charming ornament to the garden; bears, throughout the hot and rain seasons, a constant succession of large, bright-yellow blosoms, which are open not only in the evening, but continue so during a great part of the day: though perennial, it is best renewed from seed yearly in October.

Fuchsia.

No plant of this genus has ever been found able on the plains, to survive beyond just the commencement of the hot season. Specimens have occasionally been shown in Calcutta blossoming in the cold weather, but these have in every instance, I believe, been brought down, just at the close of the rains, from the hills.

It is, however, cultivated with the greatest success on the hills, where it forms one of the chief ornaments of the garden and the glass-house. The method of cultivation adopted is to secure, say in October, a good collection of plants. As the winter advances, the pots containing them should be plunged into the ground, and protected from the snow by portable glazed frames. If these are not available, under some other shelter, so long as they are protected. They must be just kept alive by watering very sparingly. About the end of February, when the snow has ceased, the pots containing the plants should be taken up, and the

plants pruned, turned out of their pots, and repotted into fresh soil, made up of leaf-mould, sand and loam. They should now be watered more liberally, for they will be making their new growth. The plants should be kept under shelter until the weather becomes perceptibly warmer, when they may be exposed to the sun and air. Frequent applications of liquid manure and soap suds will benefit them immensely. They will bloom in great profusion from April to September.

They are very easily propagated by cuttings put down at any time from March to September, and every slip will strike if put down in pure sand with bottom heat.

The number of varieties in cultivation is very considerable; and it is therefore needless to give a detailed list here. New varieties are being constantly imported by amateurs and others on the Hills, and the best way to secure a good collection is to attend auction sales of plants, which are very frequent on hill stations, when really fine varieties may be obtained at a trifling cost, or cuttings may be purchased from some of the public gardens or private nurserymen. As a rule, the writer has been able to obtain a good number of varieties by simply asking for a few cuttings from each of his friends who were fond of keeping plants.

BELVISIACEÆ.

Napoleona.

N. imperialis.—A shrub of handsome growth and Camellia-like appearance; native of Sierra Leone; fine, handsome plants, were in the Calcutta Botanical Gardens, in the open ground, as well as in Mr. Grote's garden at Alipore, where they bore in March and April, close upon the stems, and all but hidden by the leaves, their not very showy flowers, which are of an apricot-orange colour, and somewhat like those of a Passion-flower. It is easily multiplied by cuttings in the rains.

MELASTOMACEÆ.

Centradenia.

C. floribunda.—A small herbaceous pot-plant, native of Mexico, with dark-red stems and narrow lanceolate leaves, from an inch to an inch-and-a-half long; bears from February to March a profusion of small rose-coloured flowers, at which time it isa tolerably pretty object, resembling one of the annuals in bloom. **C. grandiflora** is a large flowered variety of the above, while **C. rosea** differs little from it. Cuttings strike easily.

Arthrostemma.

A. lineatum.—A pot-plant, native of Peru, with elliptical rough leaves, one to two inches long : in my opinion of no great merit, though considered choice by some; bears in the cold season, rather profusely, largish heads of dingy-white flowers of moderate size. Propagated by removal of suckers.

Pleroma.

P. trinervia.—A choice and delicate pot-plant, of woody habit, but of small growth; very ornamental if only for its rich-green peculiar foliage; bears during the hot months handsome pale-purple flowers of moderate size. Propagated by cuttings under glass in the rains.

Melastoma.

1. **M. malabathricum.**—A small shrub, similar in character to the last, but of larger habit, and loose and untidy in its mode of growth; a rather delicate plant, requires to be grown in a pot; bears in the cold season large pale-blue flowers; produces seed abundantly, from which it can be raised easily.

2. **M. sanguineum.**—Bears in the cold weather purplish-blue flowers, in all other respects very similar to the preceding; occasionally yields seed, from which young plants may be raised.

Osbeckia.

A genus containing many handsome plants with the peculiar characteristic three-ribbed leaves of the Melastoma and Pleroma, and producing beautiful flowers very similar to theirs; many species are natives of our Indian hills, but none, that I am aware of, able to endure the climate of the plains.

Medinilla.

M. vagans.—A small pot-shrub, very handsome from its dark rich glossy leaves; bears small crimson flowers, very numerous, and somewhat like those of an Ardisia, seemingly not opening well. A rare plant. Propagated by cuttings.

Sonerila.

S. margaritacea.—A lovely small pot-plant, with oval-pointed polished dark-green leaves, marked with rows of pearl-like spots, and

with deep-red stems; bears numerous small pretty three-petalled pink flowers, with showy yellow anthers. Native of the hills of India, and has been exhibited at the Calcutta shows, but is a very rare plant. Several other species are met with in Assam. Propagated by cuttings.

Cyanophyllum.

1. **C Burmanni.**—Suited only for the Betel-house; as well as 2 **C. magnificum,** with leaves of exquisite beauty, deep-green, velvety above, with three white nerves, and violet-purple beneath; one of the grandest of ornamental-leaved plants. Also **C. bowmanni** and **C. spectandum,** both with highly ornamental leaves. Propagated by cuttings in sand under glass in the rains.

Memecylon.

1. **M. tinctorium.**—A large woody shrub, or small tree, native of the junguls of India; a very beautiful ornament to the garden for its cheerful glossy foliage, as well as for its flowers; blossoms in March with very small, fragrant lilac flowers, cleaving to the stems in compact little bunches, and covering them in boundless profusion. Propagated by layers and by seed.

2. **M. capitellatum.**—Differs from the preceding only in that its leaves are smaller, and that it is somewhat later in its period of blossoming.

MYRTACEÆ.

Melaleuca.

M. cajeputi—CAJEPUT OIL-TREE.—A moderate-sized tree with pleasing dark, evergreen, willow-like foliage, forming an agreeable contrast with the ashy-grey colour of its withered-looking bark. In much esteem among the natives, who make use of the large flakes of inner bark, which are easily torn off, for inscribing their sacred writings upon. Bears small whitish flowers of no interest. Produces seed abundantly, which when sown by hand is rarely found to germinate, though numerous plants spring up self-sown around where the tree stands.

Eucalyptus.

BLUE-GUM TREE.

An extensive genus of ornamental trees, natives chiefly of Australia, although some species are found at the Cape. They are remarkable for

the aromatic odour of their leaves, and highly esteemed as medicinal plants. They also possess the peculiar property of rendering swampy and malarious tracts healthy. For this reason a large number of varieties have been introduced into this country, where many of them have been found to grow very well. The variety most commonly cultivated is the **E. globulus**. On the Nilgherries they now form a conspicuous feature of the forest scenery. In their native forests many of the species grow to a height of over 300 feet, and are among the giants of the woods. A few of those of moderate growth, planted among clumps of other shrubs, have a fine effect. They are generally propagated by seed; but cuttings put down in October have been known to strike.

Callistemon.

A genus of small trees, of which Don writes: "All are worthy of cultivation from the neatness of their foliage and beauty of their blossoms, especially those with splendid flowers of crimsom and scarlet."

1. **C. linearis**—AUSTRALIAN BOTTLE-BRUSH.—A small tree of willow-like foliage, remarkably beautiful in April, when in blossom, with its numerous bottle-brush-like tufts of brilliant crimson flowers.

2. **C. salignus.**—An extremely handsome and graceful tree-shrub of willow-like foliage, the leaves emitting, when bruised, a myrtle-like odour. Very pretty when in blossom in April and May, with its numerous small white flowers.

Both of the above are propagated by cuttings put down in November.

Punica.

1. **P. granatum, fl. pl.**—THE DOUBLE-FLOWERED POMEGRANATE—*Gool-i-Anâr.*—The splendid large vermillion-coloured blossoms of this shrub render it a fine ornament, especially in a large garden, when seen from a distance. The shrub itself, independent of its flowers, is anything but a pleasing one, and, without attention given to the pruning of it, becomes very straggling and unsightly. Sir J. Paxton says: "All flowers are produced at the extremities of the young branches formed the same year; cut away, therefore, all the weak branches of the former year, and shorten others according to their strength." Propagated from seed or by removal of suckers.

2. **P. nana**—THE DWARF DOUBLE-FLOWERED POMEGRANATE.—A pretty pot shrub about a foot in height; a great improvement upon the preceding, of which, Mrs. Loudon says, without doubt it is only a variety. There is said to be likewise a double white variety, but this I have never met with in India.

Myrtus.

1. **M. communis**—COMMON MYRTLE—*Bilâetee Menhdee.*—This old familiar and most agreeable shrub thrives well in all parts of India, but better in the North-West, I think, than in Bengal. In neither locality does it attain to a very great size. It bears its pretty small white flowers, succeeded by its blue-black berries, in the cold season. Propagated by layers and cuttings.

2. **M. tomentosa.**—A handsome shrub, native of the Nilgherries, bearing a profusion of pink blossoms somewhat resembling those of the Peach. Mentioned in Dr. Voigt's catalogue, but, possibly from the climate being unsuited to it, not existing in the Calcutta Botanical Gardens.

Caryophyllus.

C. aromaticus—THE CLOVE—*Lông.*—Native of Moluccas, where it grows to a rather large tree. Don says: "It is difficult to transplant. Seeds are usually sown where trees are intended to remain; for if the roots are once injured, it is seldom they recover." Dr. Voigt states that "in Bengal it can scarcely be kept alive throughout the year." Plants, however, I have been credibly informed, may be found in one or two gardens in Calcutta as much as four feet high or more.

Eugenia.

1. **Eu. pimenta**—ALLSPICE.—Grows to a tree of considerable size; but small shrubby plants are common in the Calcutta gardens, and are very desirable for their ornamental bright foliage and for the fine fragrance of the bruised leaves.

2. **Eu. ugnea.**—An ornamental shrub with large fragrant leaves.

3. **Eu. zeylanica.**—A pretty shrub, with flowers and foliage in every respect resembling those of the Myrtle, but larger.

Jambosa.

J. malaccensis.—In all respects a very ornamental tree, with large, handsome, laurel-formed, dark, glossy leaves, which relieve superbly the fine bunches of flowers with their numerous long crimson filaments; very striking also when covered with its beautiful fruits. Propagated by seeds in the rains.

CACTACEÆ.

A rather numerous group of succulent plants, of which Dr. Lindley remarks: "America is the exclusive station of this order, no species appearing to be a native of any other part of the world." Some, how-

ever, must have been introduced into India at a very early period, as they are now naturalised in the jungul in nearly all parts of the country. Of Echinocactus, Mammillaria, Cereus and Opuntia, the number of species is very great, most of which would in every probability thrive in India with proper care. The number of species we possess is comparatively small, but as large, perhaps, as there is any need of for the adornment of our gardens; for they are more curious than ornamental, and it is not desirable to possess many of them. To dispose them to blossom, they should be allowed a certain amount of exposure to the sun, particularly after their season of growth is past; but some of the smaller and more delicate kinds, if put out entirely in the sun, are apt to become scorched and to shrivel. These, too, are very liable to rot, if left exposed to the wet during the rains. With regard to nature of the soil best suited to them, Mr. McIntosh observes :—

"A very erroneous notion has prevailed that succulents should be planted in lime-rubbish, gravel, or similar porous matter, with a view to prevent them from growing too rapidly, and also that they should scarcely have any water given to them. Succulent plants in general do not require much water when in a dormant state; but when they are growing vigorously, they require as large a share of that element as any other plants not exactly aquatic. The tree-flowering Cacteæ should be placed in the richest possible soil, but at the same time it must be capable of admitting the water to pass through it freely, and for that reason may have a portion of lime-rubbish, broken pots, or small pieces of broken bricks mixed with it to keep it open and porous. Poor sandy soil should be discarded, and even peat earth is not rich enough for these plants."* [These observations contain all that is essential for the successful cultivation of these plants.]

They are very tenacious of life, a single joint may be conveyed almost any distance without detriment, and will strike upon being inserted in sand and kept moderately watered. In England those of a spheroidal form are sometimes grafted upon stocks ofPereskia Aculeatea, by making a small hole in their base and placing it upon the stem of the Pereskia, sharpened to a point, and binding a little moss round the place of juncture of graft and stock.

Melocactus.

TURK'S-CAP, OR MELON-SHAPED CACTUS.

A name significant of the form of the plants, which produce their flowers on a head covered with dense woolly and bristly hairs.

* 'The Greenhouse,' pp. 182 and 186.

M. erectus is in the Botanical Gardens. Others noted as most worthy of cultivation are—**M. depressus**; **grengelii**; **macracanthus**; **polycanthus**; **pyramidalis**; **sellowii.**

Mammillaria.

NIPPLE-CACTUS.

Described as "dwarf plants composed of an assemblage of tubercles somewhat resembling the teats of animals. These are generally terminated with bunches of hairy bristles, and between them the flowers appear."* To me they rather look like, as regards form, a cluster of small Gherkins. The few that our gardens contain, so far as I am aware of, are:

1. **M. tenuis.**—Pretty and delicate-looking from its club-like lobes being hoary with bristles. Suited to a pot of about the size of a tea-cup. Flowers described as pale yellow.

2. **M. pusilla.**—Resembles a little heap of balls of worsted; flowers described as pale red.

3. **M. longimamma.**—Lobes or tubercles long and thin, like a man's little finger; quite smooth, surmounted with a starry head of bristles. The flowers are described as "produced on the summits of the stems, and the largest and most beautiful of any of the genus, opening in the sun: the interior divisions of a brilliant yellow, the exterior reddish."†

Others mentioned of especial merit are—**M. atrata**; **andræa**; **carnea**; **cirrhifera, spinis fuscis**; **coronaria**; **depressa**; **fulvispina**; **karwinskii**; **mangnimamma**; **quadrispina**; **sphacelata**; **wildiana.**

Echinocactus.

HEDGEHOG-THISTLE.

Curious prickly globular-formed plants.

1. **E. echidne.**—Of curious growth, resembling a ribbed Melon, of the size of a cricket-ball, with star-like arrangements of thorns along the ribs; bears in February pretty, delicate, pinkish-white flowers of the size of a Daisy, and somewhat like those of a Mesembryanthemum, in little groups near the summit of the plant.

2. **E. multiplex.**—Described as bearing flowers of a delicate flesh colour, as large as the plant itself, which is of a balloon form. In the

* 'Cottage Gardener's Dictionary.' † 'Le Bon Jardinier' pour 1866, p. 567.

Botanical Gardens are likewise—3; **E. williamsii**; 4. **E. hexædrophorus**; 5. **E. notophorus**; 6. **E. platycerus**; 7. **E. eyresii.** Mentioned also as especially deserving of cultivation are:—**E. echinatus**; **densus**; **gilliesii**; **imbricatus**; **latispinus**; **mackieanus**; **montevidensis**; **parvispinus**; **platyacanthus**; **scopa**; **spinis albis**; **subgibbosus**; **tenuispinus**; **tubiflorus.**

Cereus.

TORCH-THISTLE.

Curious thorny, long-stemmed, strong-growing plants, demanding very little care in their cultivation. The soil best adapted for them is a mixture of vegetable-mould and decayed cowdung, well intermixed with crocks and broken bricks.

1. **C. eriophorus.**—A climbing plant, curious for the woolly kind of substance with which the stems are covered.

2. **C. grandiflorus.**—NIGHT-BLOWING CEREUS.—Mr. Gosse writes:—"The magnificent flowers are seldom seen. The plant seems a shy bloomer. In order to see it in perfection, one must see it open at midnight. Cut a few inches of the stem on each side of the maturing bud and bring within doors. Soon after dark it begins to open, and towards midnight expands its noble beauty; a disk six inches in diameter, very double, pure-white in centre, exterior yellow- brown, most deliciously fragrant of clove perfume. In the morning beauty and fragrance are gone." In this country it is neither a rare plant nor a shy bloomer, but from the immense size to which it grows is only admissible in a garden of great extent. Its flowers may be witnessed in perfection at daybreak and for some little time after. The flowers, it is said, may be preserved in full beauty for a long time if the pistil be removed before impregnation.

3. **C. speciosissimus.**—This also, seen in the night, when in full blossom, is said to be an object of almost unrivalled splendour.

4. **C. nycticallus.**—A climber, requiring an extensive kind of support for its thin long-jointed stems, which throw out numerous fibrous roots, whereby it adheres to a wall or trunk of a tree, against which it may be planted; bears in May very large white flowers, which open in the night and perish at the dawn.

5. **C. hexagonus.**—A very common plant of the size of a large shrub, with stout six-ribbed stems; bears during the rains a succession of numerous large white flowers in the night-time, which perish soon after daylight.

The names of others found in our gardens, but calling for no particular description, are:—6. **C. triangularis.**—A climber; very

common. 7. **C. tetragonus**; 8. **C. bonplandi**; 9. **C. jamaicensis**; 10. **C. loranthoides**; 11. **C. multangularis.**

Epiphyllum.

A genus of plants with stems resembling a combination of irregular edged straps or ribbons growing out of each other in succession.

1. **E. Hookeri.**—A plant of considerable size, requiring a large pot; grows very rapidly, and is apt to let droop its long flat stems over the ground and look very untidy; bears during the hot and rain seasons numerous very large star-formed, white flowers, comprising very many long narrow petals. These open in the evening and perish the following morning. At Ferozepore I had plants which throve vigorously and grew to a great and unmanageable size, but never blossmed, which is surprising, as the plant blossoms so freely in Bengal.

2. **E. truncatum.**—This, of which we possess three varieties, bears in the cold weather large gorgeous flowers of a clear bright pink or rose colour, which, unlike those of so many of the order, have the merit of displaying their beauty in the day-time. A very delicate and fragile plant, soon broken to pieces if not sheltered from the wind or any rough treatment; thrives in a soil of silver-sand with the admixture of a little vegetable-mould. The largest specimens will not require a pot of larger size than a sugar-basin, which for safety's sake it is well to insert in a larger pot filled entirely with crocks, whereon the drooping fragile stems may rest without fear of rotting. From its delicate habit it requires to be kept in the shade, but possibly a certain amount of exposure to the morning sun would be beneficial. Any small piece broken off and inserted in the soil will take root. But Sir J. Paxton says: "To obtain young specimens, keep a little damp moss round any of the branches and roots will speedily be found at the place." In England, as a matter of curiosity, it has sometimes been grafted upon Pereskia. A young stem of the latter has its head cut off and a small slit made. In this the flat stem of the Epiphyllum is inserted and the graft tied round with a little moss. The attempts made to effect this in this country I have never known to prove successful, which is of the less consequence, as it is considered preferable to grow the plant on its own roots.

3. **E. alatum.**—A plant similar to, but of stouter habit than, the preceding. I have not seen it in blossom. Flowers said to be white.

Rhipsalis.

R. salicornoides.—A curious plant, with short-jointed stems growing successively upon each other like small pieces of tobacco-pipe united. Flowers small, yellow, and in no way interesting. Dr. Voigt

states that they "never appear here." I have, however, seen plant in blossom in the Calcutta Botanical Gardens, as well as at the Horticultural shows here. In its native locality it is epiphytal, the growing of it in pots is probably the cause of its being so shy of blooming.

BENGAL SECRETARIAT LIBRARY

Opuntia.

INDIAN FIG, OR PRICKLY CACTUS.

There are several species of this genus of singular plants, which produce their large oval-formed, thick, flat leaves, one from the edge of the other, and are usually covered with star-like arrangements of sharp bristles. Most bear large golden-yellow flowers of metallic hue, but upon the whole are not objects sufficently agreeable to be allowed a place in the garden.

Pereskia.

1. **P. bleo**—BARBADOES GOOSEBERRY.—A large spreading shrubby plant, with cylindrical stems covered with long needle-like spines, and, unlike most plants of the order, bearing abundance of leaves. Flowers very pretty, resembling small single pink roses; nearly always in blossom.

2. **P. aculeata**.—In general appearance much resembling the foregoing, but a smaller plant. Dr. Voigt states that this species blossoms in Bombay, but not here, and in England very seldom. I have not seen it in blossom myself, but the native dealer from whom I obtained specimens at Hooghly assured me that it blossomed in the cold weather. Flowers described as white.

GROSSULARIACEÆ.

Ribes.

R. rubrum—THE FLOWERING RIBES.—This shrub, so beautiful an ornament in our English gardens, is only mentioned here to intimate the improbability of its ever being brought to thrive on the plains of India, though it grows and blooms freely on the hills.

ESCALLONIACEÆ.

Escallonia.

E. macrantha.—A beautiful rich-green shrub, bearing bright-pink fragrant flowers. This very choice plant succeeds with difficulty even

in the elevated region of Bangalore. There is little probability of its living in the lower plains of India.

Itea.

I. Virginica.—Don says: "When this shrub is in vigour, it is entirely covered with racemes of white flowers and then makes a fine appearance." Dr. Voigt mentions it in his Catalogue as at that time lately introduced. It is quite unknown in the Government Botanical Gardens now.

PHILADELPHACEÆ.

Philadelphus.

P. coronarius—SYRINGA—MOCK ORANGE.—This shrub, so common in English gardens, and well known for its fragrant cream-coloured blossoms, similar to those of the orange, may be found in existence occasionally in India, but only in the most stunted and unthriving condition. On the hills, however, it can be cultivated successfully.

Deutzia.

D. scabra—A shrub much resembling the preceding; bears its delicate white flowers in terminal racemes. "When large and in full bloom," Sir J. Paxton says, "its beauty can hardly be imagined by those who have not seen it." A tolerably common plant in Calcutta, where it thrives moderately well, but far from realises the above high estimate of it; it is apt to throw up numerous suckers, which should be removed.

BARRINGTONIACEÆ.

Barringtonia.

1. **B. speciosa.**—A tree notable for its large handsome character of foliage; bears great heads of blossom, with large flowers made up of a numerous assemblage of long deep-rose-coloured filaments, and which have been likened to painters' brushes; native of the Straits, and said to love the shore of the sea; hardly, if at all, known in our gardens here.

2. **B. racemosa.**—A stout timber-tree of similar character to the preceding. Major Drury remarks: "When in flower it has a most beautiful appearance from its long pendulous racemes of rose-coloured flowers; commonly to be met with along the banks of the backwaters in Travancore." Little known, I believe, on this side of India.

3. **B. acutangula.**—A large timber-tree. "Grows," Roxburgh says, "to resemble a middle-sizedwell-shaped oak, and bears at the beginning of the rains long pendulous racemes of scarlet flowers." Common in most parts of India.

Gustavia.

G. augusta.—A small but stately tree, native of tropical America, and allied to the preceding, with magnificent foliage, the leaves being a foot or more long, of oblong form, of a fine dark glossy green. Bears large handsome white flowers, though it has not, I believe, been known to bloom in this country. A rare plant, best grown in the grass conservatory in a pot.

VACCINIACEÆ.

Thibaudia.

T. setigera.—Sir J. Paxton observes: "A truly magnificent and interesting shrub; native of India. At its roots are immense thick fleshy nodosities, which coil round the trunks of trees on which they fix, or adhere to some portion of rock in a surprising manner. Any light soil suits it. Its small fibrous roots should only just be covered." Occasionally met with in the Calcutta gardens. Comes into blossom in January and February with clusters of very rich and handsome tubular red flowers, in form like those of a Heath, an inch long; the leaves resemble those of the Oleander, but are smaller. Propagated by cuttings and seeds in the rains.

CINCHONACEÆ.

Serissa.

S. fœtida.—A very pretty small shrub, about two feet high, with very small dark-green shining leaves; native of China; nearly always in blossom with its sparkling very double white flowers, of the size of a shirt-button, which, when bruised, emit a detestable smell. Single-flowered specimens are also to be met with, but not so common. Easily propagated by slips or cuttings, or, it is said, by cuttings of the roots.

Psychotria.

1. **P. undata.**—A shrub of moderate size, with foliage of a pale lurid green; bears in April and May compact heads of greenish-white flowers; not an agreeable plant. 2. **cyanococca.** 3. **chontalensis.** Propagated by cuttings in the rains.

Coffea.

1. **C. Bengalensis.**—A small shrub, exceedingly beautiful in the month of February, when in full blossom, with its pure white flowers, similar to, but smaller than, those of the White Periwinkle, in such countless profusion as to produce a most brilliant effect in the border. Propagated by seed and cuttings.

2. **C. Arabica**—THE COFFEE-PLANT—*Kuhwa.*—A much larger and taller-growing plant than the last; bears flowers somewhat similar, but rather scantily, and is not nearly so interesting in an ornamental point of view.

Pavetta.

A genus of plants in general appearance hardly distinguishable from the Ixoras. Propagated by cuttings in the rains.

1. **P. Indica.**—A large jungul shrub, with large laurel-form dark, glossy-green leaves, with white midrib. Its foliage is its principal point of beauty; bears in February trusses of dirty-white rather fragrant flowers.

2. **P. tomentosa.**—A large coarse shrub; bears loose heads of white flowers of little merit otherwise than for their fragrance.

3. **P. Richardiana.**—A shrub with small neat foliage; bears small white flowers of not much merit.

4. **P. diversifolia.**—A single plant of this, introduced from the Mauritius, has been for some years past in the Calcutta Botanical Gardens, where it seems to thrive well; remarkably ornamental for its large laurel-form, glossy leaves, which when young are beautifully marbled.

5. **P. bourbonica**—Is a recent introduction.

Ixora.

A genus that comprises several of our most beautiful flowering shrubs, the splendour of which, when in the full perfection of their bloom, nothing can surpass. During the time they are in bloom an occasional application of liquid manure will be found beneficial, and after they have done blooming they are the better for being pruned in closely. Some yield seed freely, from which young plants may be easily raised; and all may be propagated more or less easily by cuttings or by layers put down in the rains.

A writer who signs himself "Alpha" says:—"All the varieties are easily propagated by cuttings; but some of them, as Salicifolia, Griffithi, and Acuminata, are so wanting in the tendency to form bushy plants, that well-furnished specimens of them can hardly be obtained, save by

grafting them on good-sized well-bottomed plants of some better-habited variety. Coccinea is, judging from my own experience and observations, the best for grafting upon. I also graft floribunda, which, although of a sufficiently bushy habit, is rather delicate and but a slow grower on its own roots. Acuminata throws very large heads of bloom; and I expect that, grafted on coccinea, it will form fine specimens and be more effective than alba."*

1. **I. acuminata.**—A shrub five or six feet in height. Dr. Roxburgh describes it as "a very charming shrubby species; native of the forests near Sylhet, where it blossoms during the hot season and perfumes the air with the fragrance of its flowers." And Dr. Wallich adds: "The opaque, remarkably pale and glaucous leaves, the subsessile crowded corymbs of large white blossoms, with white calyces, sufficiently distinguish this elegant shrub from all the other species."

2. **I. alba.**—A small shrub, native of China, with handsome rich foliage of lanceolate leaves, from three to six inches long; generally considered a variety of I. stricta. One of the most choice and beautiful plants of the whole genus; bears its large, full, close corymbs of milk-white scentless flowers in great profusion during the hot and rain seasons, but in highest perfection in the months of March and October. Bears no seed, but may be propagated with little difficulty by layers or cuttings

3. **I. bandhuca.**—A round bushy shrub, of moderate size, about the commonest of the genus; distinguished from I. coccinea, which it resembles, by the leaves ending in a blunt oval form, and by the close way in which their heart-formed base embraces the stem; bears its compact beautiful corymbs of fine scarlet flowers throughout the whole year, but in perfection during the rains. It requires to be pruned in about November, or it is apt to become straggling and unmanageable. May be propagated by seed, which it bears abundantly in the cold season, or by layers and cuttings, which in the rains root with the greatest readiness.

4. **I. barbata.**—A shrub of very large growth, with fine rich, deep-green, lanceolate leaves nearly a foot long; bears in the hot season large, lax, irregular corymbs of long-tubed white fragrant flowers, singular for the fringe of white hair round their mouths. Produces seed in the cold season.

5. **I. brachiata.**—A stout, not very ornamental shrub; bears in March panicles of minute white flowers. Seeds in May.

6. **I. coccinea.**—A shrub about three or four feet in height, about the commonest, and certainly about the most beautiful, of the genus. Flowers bright scarlet, in large, compact, handsome corymbs; nearly

* 'The Florist and Pomologist,' vol. for 1863, p. 45.

always in blossom, but in perfection during the rains, when it is a truly splendid object. Nothing can be finer than the contrast afforded by the glowing scarlet trusses of bloom against the dark rich bay-green of the leaves. Yields seed in the cold season.

7. **I. crocea** or **crocata.**—A choice shrub of the English stoves; bears handsome trusses of fine orange-coloured flowers. Unknown in this country.

8. **I. cuneifolia.**—A shrub of tree-like growth; bears in March and April a profusion of compact balls of pure white fragrant blossom, of the size of an Orange, which present a truly delightful appearance as they wave to and fro by the force of the wind. Ripens seed in September.

9. **I. grandiflora.**—Sir J. Paxton says it is only a large-flowered variety of I. coccinea.

10. **I. superba.**—The proper name of the plant, misnamed I. grandiflora, in the possession of some two or three gentlemen in Calcutta; native of Assam; from not more than about a foot and-a-half to three feet in height; extraordinary for the immense size of its leaves, and when in blossom in April, with its huge head of white flowers, very suggestive of a great overblown Cauliflower.

11. **I. fulgens.**—Dr. Roxburgh observes:—"This elegant, highly ornamental shrub is a native of the Moluccas, and from thence was introduced into the Botanical Gardens, where it blossoms most part of the year." Has smooth lanceolate leaves from six to eight inches long, and bears corymbs of numerous long-tubed, pretty, large, scarlet flowers.

12. **I. hydrangeæformis.**—Discovered by Mr. Griffith at Singapore, and described in Curtis as a noble shrub, with fine lanceolate leaves a foot long, producing handsome trusses of rich yellow and orange-coloured flowers, superior either to those of I. coccinea or I. stricta. Not to be met with anywhere about Calcutta that I am aware of.

13. **I. incarnata.**—A small choice shrub, native of China, with fine dark-green foliage; considered, like I. alba, a variety of I. stricta; nearly always in blossom with corymbs of pretty flesh-coloured flowers. Propagated only by inarching: cuttings and layers do not succeed.

14. **I. sp. ex Java.**—A species so denominated in the Calcutta Botanical Gardens; a handsome shrub of moderate size; bears at the beginning and end of the hot season a great profusion of large trusses of creamy-white fragrant flowers.

15. **I. javanica.**—A small shrub, accounted one of the very finest of the genus; but such as are met with in the Calcutta gardens are very far from meriting that high rank. It suffers during the cold months, and young plants at that period can with difficulty be kept

alive. Distinguished by having leaves softer and less rigid than others of the genus; bears during the rains compact corymbs of orange-scarlet flowers, rather inclining to an apricot colour. Sir J. Paxton remarks that this plant is remarkably handsome from "the younger branches being of a rich coral colour, the tube of the corolla an inch-and-a-half long, and the limb an inch across:" points as regard size and colour not found in the plants we have here.

16. I. **lanceolaria**.—A shrub about five or six feet high, remarkable for its narrow leaves, six inches long and one broad; bears in the hot season greenish-white flowers, and seeds at the beginning of the cold season. Dr. Wallich observes:—"This species is so distinct from all the others as to be easily known. Its slender hanging branches, pallid and glaucous leaves, and the small corymbs of crowded flowers, contribute to render it a very ornamental plant in the shrubbery."

17. I. **longiflora**.—A handsome lanceolate-leaved shrub; bears in August and September, lax corymbs of exquisitely fragrant white flowers, with exceedingly long tubes.

18. I. **opaca**.—A large shrub, compared with other species, of rather coarse appearance; bears large corymbs of very fragrant white flowers, before opening, prettily tipped with red.

19. I. **parviflora**.—A small tree; bears in March small dingy white, somewhat fragrant flowers. Not attractive when in flower, and far from being so at any other time.

20. I. **ragoosula**.—A species so-called in the Agri-Horticultural Society's Gardens, but whence the name is derived, or of what it is the corruption, I have in vain endeavoured to discover. A most delightful erect shrub, about four feet high, not bushy, with smooth oblong leaves, about three-and-a-half inches long; bears in constant succession, almost throughout the whole year, small pretty corymbs of delicate rose-coloured flowers. Propagated easily by cuttings.

21. I. **rosea**.—A shrub about five feet high, of spreading habit, with oval, smooth, firm leaves, about six inches long; flowers of the same colour as those of the last, but larger, and in larger loose corymbs. Dr. Wallich remarks:—"This shrub is exceedingly elegant on account of its large round corymbs, which for eight months of the year are produced in a constant succession. The colour of the flowers is a pale pink, gradually becoming reddish as they grow old, beautifully contrasting with the shining dark-green leaves, which are not unlike those of I. bandhuca."

22. I. **stricta**.—A small woody shrub, three or four feet high, of erect growth, rather scanty both of stems and of foliage; leaves oval, smooth, about five or six inches long; bears, more particularly in March and April, large, very compact, convex corymbs of flowers of a

scarlet-salmon colour, the exquisite beauty of which nothing can excel. Dr. Roxburgh, however, remarks that "it is by no means so gaudy as I. coccinea and I. bandhuca, which are certainly two of our most showy Indian shrubs." In my opinion bandhuca will not for a moment bear comparison with it. The pallid sickly hue of the foliage often much detracts from its beauty, and the stems of plants of any age have mostly a cankered, unhealthy appearance, as though the climate did not altogether suit it.

23. **I. undulata**—*Pâluk-jooee.*—A large ramous shrub, with large lanceolate, wavy leaves; bears in April corymbs of numerous small white flowers, having a powerful jasmine fragrance.

24. **I. villosa.**—A large shrub, with large, lanceolate, wavy leaves, as much as ten inches long; bears in April large corymbs of white, fragrant flowers, with very long tubes and very small limbs.

25. **I. floribunda.**—A new and remarkably distinct species lately introduced into the gardens about Calcutta; a dwarf, bushy pot-shrub, about a foot and-a-half high, with small smooth, lanceolate leaves, hardly two inches long; bears during the hot and rain seasons neat dense trusses of bright-scarlet flowers: extremely beautiful, particularly in April, when it is perfectly loaded with blossom. Propagated by cuttings with not much difficulty.

To the foregoing have of late been added: **amabilis, amboinensis, affinis, dixiana, Duchess of Teck, Duffi, formosa, Lobbii, Pilgrimii, Prince of Orange, princeps, profusa, regina, sanguinea, spectabilis, speciosa,** and **Westii.**

Chiococca.

C. racemosa—SNOWBERRY.—A small shrub; though somewhat graceful, of no great merit; bears in May and during the hot season, pale-yellow, small, inconspicuous flowers in great abundance. Propagated by cuttings in the rains.

Pæderia.

P. fœtida.—A remarkably pretty, slender, and extensively-growing climber, bearing in October drooping festoons of small bell-flowers, purple varied with white, emitting a smell so abominable as to create a perfect stench in the neighbourhood around. Propagated by layers in the rains.

Hamiltonia.

1. **H. azurea.**—A large shrub with slender branches, apt soon to become, straggling, decrepit, and unsightly, and needing, therefore, to be well cut in every year to keep it neat and in form; bears in

December great plume-like heads of very small but very bright and numerous lavender-coloured flowers, which emit for some distance around a most delightful fragrance. Easily propagated by cuttings put down in October after pruning.

2. **H. suaveolens.**—A large stout shrub, somewhat similar to the preceding, but with flowers which are nearly white, and leaves of much larger character; blossoms from November to February with deliciously-fragrant flowers, and continues for a long time a delightful ornament to the garden. Vastly improved by being well cut in after flowering. Propagated by cuttings in October after pruning.

Leptodermis.

L. lanceolata.—A small shrub; bears in September, small lavender flowers of little beauty. Common in Indian gardens, and propagated by cuttings in the rains.

Hamelia.

1. **H. patens.**—A tree-shrub of dense rich-green foliage: ornamental for its boundless profusion of sprays of orange-coloured blossoms, upon which numerous humming-birds are from morning to night for ever hopping, and inserting their little beaks into each of the short pipe-like flowers to extract the nectar. The sprays of flowers are intermingled with bunches of pea-sized, blood-coloured berries, which, however, seldom ripen but in the cold weather, when they turn black. No plant is more easily propagated either by cuttings or by seed.

2. **H. sphærocarpa.**—A shrub of lower growth, stouter stems, with larger and more showy orange coloured blossoms, and with rich verdant leaves, much larger and thicker than those of the preceding; the name assigned is apparently a misnomer, as the fruits are egg-formed, and not at all spherical. This species drops its leaves in the cold season, and the branches, at that time bare, are benefited by being cut in, when cuttings may be put down which strike readily.

Pentas.

P. carnea.—A small herbaceous shrub, very common, but a truly beautiful plant; bears, in constant succession, Ixora-like heads of rather small, pale-lavender-coloured flowers. Easily propagated either by slips or by seed in the rains.

Wendlandia.

1. **W. paniculata.**—A rather large woody shrub or small tree bears in February, in great profusion, splendid large plumes of small

pure-white flowers, and is then a most beautiful object to view. Propagated by cuttings in November.

2. **W. exserta.**—Dr. Roxburgh speaks in highest praise of the beauty of this plant; but I have been unable to learn of its existence, or indeed of any particulars concerning it, in the Calcutta Botanical Gardens.

Rondeletia.

R. punicea.—A small hard-wooded shrub about three feet high, one of the commonest, and at the same time one of the handsomest ornaments of our gardens; bears in constant succession, through the hot and rain seasons, compact moderate-sized trusses of beautiful orange-scarlet blossoms, somewhat like miniature heads of Auricula: these, as they decay, should be removed, otherwise they remain a very long time on the plant, giving it a dirty unsightly appearance. Propagated by layers; these should be put down in the rains, and will take three or four months before they are ready for removal. Bears seed also, but rather scantily, in the cold season, which some little care must be taken to secure. The best plan is to search for the berries before ripe, and tie them up in fine linen, so that on ripening, when they open and discharge their seed, it may not be lost.

Rogiera.

R. thyrsiflora.—Lately introduced; of a genus of shrubs described as with oval soft-haired leaves, and bearing dense corymbs of small salver-shaped, rose-coloured flowers. Propagated by cuttings in November.

Portlandia.

P. grandiflora—WHITE HORSE.—Native of Jamaica, where it is common among rocks. Of this truly noble and choice shrub plants may be sometimes seen in Calcutta among the collections of the curious: three or four are to be met with in the Calcutta Botanical Gardens, which continue constantly in blossom, except during the cold season, from which, if not sheltered, they seem rather to suffer. The character of the foliage is very handsome, of a fine rich glossy green, contrasting well with the flowers, which are as much as five inches long, resemble those of the White Lily, and diffuse during the night the same delicious fragrance. Propagated without much difficulty during the rains by cuttings in sand.

Manettia.

M. cordifolia.—A small plant, with slender climbing stems; requires the support of a light trellis: grown in a pot, a beautiful orna-

ment for the verandah during the hot and rain seasons, when it bears in profusion its moderate-sized tubular, bright-scarlet flowers. Propagated by separation of the roots, which are of a tuberous nature; bears in the cold months cucumber-like pods of seed.

Catesbæa.

C. spinosa—SPINOUS LILY-THORN.—A shrub of moderate size, with myrtle-sized leaves; covered with large sharp thorns, hardly to be called ornamental, though when in blossom, as it is at intervals during the hot and rain seasons, curious for the strange way in which the flowers hang from it without seeming to belong to it; they are of the size and form of a large tin extinguisher, of a pale livid-green, with the mouth part cut into great notches; said to bear "a yellow berry of the size of a middling plum;" but this I have never seen. Propagated by cuttings in the rains.

Hoffmannia (Higginsia.)

A genus of very handsome-leaved shrubs, about two feet high, natives of Peru and the West Indies. They are variously known under both the names given above. They are best grown in a grass conservatory, in a light rich soil, rather free. Old mortar or concrete added to the soil gives them extra colour in the leaves. They are exceedingly lovely objects when well grown. Propagated by cuttings in sand under a glass during the rains.

1. **H. Ghiesbreghtii**—Has handsome broadly-lanceolate leaves, three to four inches long and two broad, the ribs being raised, and of a brilliant, velvetty, brick-red colour.

2. **H. Ghiesbreghtii variegata.**—Similar to the last, except that the leaves are splashed with white. 3. **H refulgens** is of low growth, with smaller leaves; so also is 4. **H. ortgiesii.** 5. **H. refulgens argyroneura** is a variegated species of No. 3; while 6. **H. robusta** resembles No. 3 very much.

Stylocoryne.

S. Weberi.—A moderate-sized shrub, with lanceolate, polished, leathery leaves, three-and-a-half inches long; bears in January and February, Ixora-like corymbs of greenish-white flowers, which emit a delightful fragrance; thrives best under shade. Propagated by cuttings in November.

Rhodostoma.

R. gardenioides.—An ornamental small shrub, about two feet high, with neat and pleasing foliage; bears in March and April Ixora-like trusses of tubular, milk-white flowers, which would be very handsome if all in the truss opened at the same time instead of only a few in succession. Propagated by cuttings in the rains.

Gardenia.

1. **G. florida**—CAPE JASMINE—*Gundha-raj.*—Native of China, but common in the gardens of India: a most delightful shrub, with neat handsome glossy foliage; leaves obovate, about an inch-and-a-half long; bears in March and April large, very double, cream-white, sweetly fragrant flowers, having much the appearance, though not the regularity of petals, of a small Camellia; grows to six or eight feet high, but may be kept to any small and convenient size by pruning. Propagated by cuttings to any extent during the rains.

Two fine varieties of this charming shrub were introduced into the Gardens of the Agri-Horticultural Society some years ago by Mr. Fortune from China, and are called by his name.

α. Distinguished by its much larger character of foliage, the leaves being full three-and-a-half inches long, and by producing much finer flowers.

β. A superb variety with very large leaves and very double flowers of immense size, fully four inches across. This blossoms somewhat later in the season. Mr. Fortune says that in China it grows to ten or twelve feet in circumference. The following description of it has also been given:—"Flowers four inches in diameter, pure-white, changing to buff, not unlike a large double Camellia. It is one of the very finest shrubs in cultivation, and ranks on a level with the double-white Camellia, which it equals in its delicious odour."*

2. **G. lucida.**—A large shrub, or rather small tree, with rich noble foliage, the leaves being of a bright shining olive-green, firm, oval, and about six or seven inches long; bears at intervals during the hot and rain seasons large handsome solitary fragrant white flowers, three or more inches across; blossoms beautifully in a dwarf condition, in which state it may easily be kept by pruning. Propagated by cuttings in the rains.

3. **G. radicans.**—A shrub, native of Japan; bears during the hot season very fragrant white flowers.

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* Botanical Register for 1846, p. 43, extracted from 'Journal of the Horticultural Society.'

4. **G. latifolia**—*Pâprâ.*—A small tree of noble foliage, with leaves some as much as fifteen inches long and six inches wide; bears large fragrant, white, nine to eleven-lobed flowers. Dr. Roxburgh speaks in great admiration of the beauty of this tree.

5. **G. ferox.**—A stout woody shrub, about four feet high; bears in May, when all but leafless, close groups of large, double, ill-shaped, white flowers, which soon decay and look unsightly, and are succeeded by fruit-pods of the size of a walnut. Though once in some esteem, not in any respect an ornamental plant.

6. **G. dumetorum.**—A tree of moderate size, bears in May very numerous small white flowers. Of no value in an ornamental point of view.

7. **G. devoniensis.**—Native of West Africa. In Mr. Grote's garden at Alipore was a shrub of this noble plant four-and-a-half feet high, where it flowered in April; described as bearing most beautiful flowers, very similar to those of the White Lily, with a slender tube.

8. **G. stanleyana.**—From Sierra Leone; described as a handsome shrub with numerous spreading boughs, and large oval, wavy, bright-green leaves; bears numerous solitary green flowers with tube and interior of throat purple, and pure white limb; delightfully fragrant.

9. **G. citriodora.**—From Natal; described as a shrub about two feet high, having pointed, smooth leaves, and bearing numerous white flowers, having the form and perfume of those of the Orange. These two last species are of recent introduction.

Also 10. **G. globosa** and 11. **G. thumbergii.**

All of the above can be easily increased by cuttings put down in the rains.

Oxyanthus.

O. hirsutus.—A small bush about two feet in height; bears in July white fragrant flowers of a star-shaped limb, and tube six inches long. Propagated by cuttings in the rains.

Mussænda.

A genus of rather large shrubs, with dense foliage of moderate-sized oval, deep dull-green leaves. In a decorative point of view there is very little difference between the species; during the hot and rain seasons they are nearly always in blossom, bearing numerous corymbs of star-formed, orange-coloured flowers. From the calyces of one or two flowers in each corymb are developed large hoary-white leaves, which, contrasting with the green of the leaves, constitute principally the ornamental character of the plants. Propagated by cuttings or by seed, which they bear abundantly, in the rains.

1. **M. frondosa.**—This, which has the largest flowers of any, being about an inch across, and orange-scarlet, is perhaps the most desirable one of the species.

2. **M. macrophylla.**—Has flowers about half the size of the last, and of deeper colour. 3. **M. corymbosa.**—Has flowers much smaller still, of a pale-orange colour. 4. **M. latifolia.** 5. **M. luteola,** differ little from the foregoing.

CAPRIFOLIACEÆ.

Weigela.

W. rosea.—A shrub like the Philadelphus or Mock Orange; bears at the end of every little side-branch loose clusters of white and rose-coloured flowers, more than an inch long, and an inch-and-a-half wide; much cultivated for its beauty in the gardens of the mandarins in China, and now a very common ornament in the gardens in England; introduced by Mr. Fortune some years ago into the Gardens of the Agri-Horticultural Society, but seemed quite unsuited to the climate, as the plants soon showed symptoms of decay, and before long perished.

Lonicera.

1. **Japonica**—JAPAN HONEYSUCKLE.—A very rambling shrub, requiring the support of a trellis or some stout posts; leaves oval, two inches long, dull whitish-green; bears at intervals, and nearly at all seasons, but principally in the cold weather, white and yellow strongly fragrant flowers; a very common plant, met with in most Indian gardens.

2. **L. periclymenum.**—A small shrub, so named in the Calcutta Botanical Gardens, but in no way resembling the common Honeysuckle of the English gardens; a not very thriving plant, with oval leaves about an inch long, deep-green above, and hoary on the under-surface; never, that I have seen, flowering here.

3. **L. diversifolia.**—A straggling, weedy-looking shrub, native of the hills of India; two or three plants in pots are met with in the Calcutta Botanical Gardens that have not flowered there; flowers described as being "of a pale-buff colour, and stalkless."

4. **L. sempervirens**—TRUMPET HONEYSUCKLE.—A very beautiful plant when in blossom with its scarlet scentless flowers: a common ornament of English gardens; set down by Dr. Voigt in his Catalogue as existing and blooming here. I have never met with or heard of it; neither have I the two following, likewise mentioned by him:—5. **L. macrantha.**—Native of Nepal. 6. **L. leschenaultii.**—Native of the Nilgherries.

7. **L. reticulata.**—Native of Yeddo, a twining plant, ornamental for its foliage of small oval leaves of a deep-green colour, beautifully netted with cream-coloured reticulations. In Mr. Grote's garden at Alipore I saw a fine specimen grown in a pot, which had become quite a small shrub. I learnt that it sheds its leaves during the cold season.

All the above are easily propagated by layers.

Abelia.

A. triflora.—Native of the Himalayas; a scandent shrub; bears in great profusion dense ball-like heads of small white, very fragrant flowers. Introduced into the Botanical Gardens, but I know not with what success.

Vibernum.

1. **V. dilatatum.**—Described by Mr. Fortune as "a fine new Gueldre's Rose;" and 2. **V. macrocephalum,** introduced by him, some years ago from China into the Gardens of the Agri-Horticultural Society; both perished, seemingly unsuited to the climate.

APIACEÆ.

Not a single plant of this extensive order contributes to the embellishment of our gardens in India.

ARALIACEÆ.

The few plants of this Order suited for the garden are ornamental solely for their foliage, not bearing flowers worthy of notice. They are all easily propagated by cuttings in the rains.

Panax.

A genus of ornamental-leaved plants which have become very popular for decorative purposes in recent years. They are ever-green, and afford a refreshing contrast by the light green of their leaves. Almost any soil suits them, and they are easily propagated by cuttings and division of roots during the rains.

1. **P cochleatum.**—Is an old varitery, the leaves resembling shallow sauce-ladles. 2. **P. fruticosum** has rather ornamental foliage, being dense and split; is an old favourite. The following are late introductions, and are remarkable for the handsome variegated finely-divided character of their foliage:—3. **filicifolium**; 4. **laciniatum**; 5. **mas-**

sangiana; 6. **plumatum**. The following are also ornamental leaved, and are much cultivated :—7. **Bausei**; 8. **elegans**; 9. **Gordonii**; 10. **obtusum**; 11. **rotundus**; 12. **serratifolia**; 13. **shepherdiana**, and 14. **veitchii.**

Aralia.

These are closely allied to Panax; indeed, some of the varieties are hardly distinguishable from them; while others are entirely dissimilar. Their cultivation is the same as that for Panax.

1. **A. papyriferia**—RICE-PAPER PLANT.—Bears a strong resemblance to the Castor-oil plant. Its only interest lies in the fact that the pith of the flower-stems yields the true rice-paper of the Chinese. It is by no means an ornament to the garden. Propagated by the suckers it throws up for some distance around; also by seed, which it produces in great abundance.

The following are eminently ornamental, with peltate leaves, finely divided, and of a dark glossy green :—2. **A Chabrieri**; 3. **Veitchi**; 4. **Veitchi-gracillinea**; 5. **elegantissima**; 6. **reginæ**. The following are also of a highly ornamental character :—7. **bemaysiana**; 8. **filicifolia**; 9. **gracillinea**; 10. **Guilfoylei**; 11. **Kerchoveana**; 12. **leptophylla**; 13. **maculata**; 14. **monstrosa**; 15. **nobilis**; 16. **parasitica**; 17. **quercifolia**; 18. **reticulata**; 19. **rotunda**; 20. **spectabile**; 21. **spinulosa**; and 22. **sonchifolia**. Some of the foregoing are of large growth; these it would be advisable to grow in the open border. Others again are of dwarf growth, and these had best be cultivated in pots, and kept in the grass conservatory.

Hedera.

H. helix—COMMON IVY.—Manages to exist as a small pot-plant, but makes no growth, and, except for association, is unworthy a place in the garden. It is common enough in the hills, where it grows in a wild state.

CORNACEÆ.

Aucuba.

Au. Japonica.—This fine mottle-leaved shrub, so familiar in English gardens, can only with great difficulty be kept alive here. A specimen or two in a small pot is all that I have seen of it in this country. But it does very fairly in the grass conservatory; while on the hills it can be successfully cultivated.

SANTALACEÆ.

Santalum.

S. album—SANDAL-WOOD-TREE—*Chundun.*—A small tree, native of the junguls of India; possesses no merit sufficient to entitle it to a place in the garden.

ARISTOLOCHIACEÆ.

BIRTHWORTH—PELICAN-FLOWER.

Aristolochia.

Several of these plants bear flowers of a most curious and indescribable form. I give the most interesting:—

1. **A. labiosa.**—A common and very extensive large leaved climber, requiring a stout trellis for support; bears in the hot season large flowers, somewhat resembling an inflated bag below with a helmet above, yellowish-white blotched with brown and purple; emitting a most offensive smell, like that of tainted meat.

2. **Brasiliensis.**—A large climber, with largish heart-shaped leaves; bears yellowish flowers.

3. **A. acuminata.**—A native of Bengal; blossoms in the hot and rain seasons with large, drooping, dark greenish purple flowers.

4. **A. crudata.**—A small climbing plant, about three feet high, with slender stems and bluntly three-lobed leaves; bears in the cold season curious liver-coloured flowers, letting hang down from their summit a tail or thread-like appendage two feet long; commonly grown in a pot, and well suited for its singularity for a place in the verandah.

APPENDIX.

APPENDIX.

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THE following is a descriptive list, with proper instructions as to cultivation, &c., of such of the plants as have come under the notice of the reviser of the present edition of this work since it was put into the hands of the publishers, as well as others which it would have been inconvenient to have placed in the body of the work under their respective natural orders. The list is alphabetically arranged for facility of reference.

Adenanthera.

A genus of shrubs and small trees, belonging to the N. O. *Leguminoseæ*, and natives of India and the Malayan Peninsula. The only species met with in this country worthy of a place in the garden is—

A. Pavonina.—This grows into a large forest tree, but, when kept well pruned in, forms a handsome bush and bears spikes of small yellow flowers. Propagated by seed sown in the rains. No care necessary in cultivation.

Not grown on the hills.

Aglaonema.

Dwarf, ornamental-leaved plants of the N. O. *Araceæ* (Aroideæ), and natives chiefly of the Indian Archipelago. They grow exceedingly well in this country in a grass conservatory, where their variegated leaves show to much advantage. A porous soil, composed of leaf-mould, sand, garden loam, and old mortar or concrete, suits them best. Propagated by cuttings and division, or inserting a leaf in pure sand under a hand-glass.

The following varieties are cultivated in Calcutta, the last named being considered the most beautiful:—**A. Lavallei**, **A. Nobilis**, **A. Pictum**, and **A. Pictum Gracile**. Cultivated on the hills under glazed shelter.

Amoora.

A. Rohituka.—A small tree or shrub, belonging to the N. O. *Meliaceæ*, and native of this country; not an attractive plant, and

scarcely fit for a place in the garden. Propagated by seed and cuttings during the rains.

Not grown on the hills.

Amorphophallus.

A small genus of Aroids, (N. O. *Araceæ*), closely allied to the Arum, which it much resembles, differing only in having the spathe spreading. The plants are very curious-looking, and for that reason alone worth cultivating in the grass conservatory. They are natives chiefly of India, and generally of tropical Asia, but the most remarkable species of the genus was found in Western Sumatra in 1878, by Dr. Beccari, a famous Italian botanist. This plant is called **A. Titanum,** and produces the largest flower in the world. Dr. Beccari wrote as follows regarding it :—"It is a gigantic Aroid, which can only be compared with the Godwinia Gigas found by Seemann in Nicaragua. I propose to name it Conophallus titanum. The tuber of one which I dug up is nearly five feet in circumference. Two men could hardly carry it; they fell down, and the tuber was broken."

He, however, secured some seeds and sent them to Europe, where they germinated. One plant of this wonderful Aroid flowered in Kew in June 1889 and caused widespread wonder. A writer in the *Saturday Review*, describing it, says: "Fancy a real bud as tall and as roomy as one of those machines in lath and canvas and Dutch metal which open at Christmas time about Drury Lane, disclosing a young woman in an attitude! That was the incredible spectacle which the wise and the learned have been coming from afar to see."

The flower, however, has an intolerable stench, which the writer quoted above likened unto that which "all the sea fish condemned at Billingsgate on a summer day raise at noon on the morrow." But it is a beautiful object nevertheless, for the same writer says :—"From the spathe, or encircling frill, rises the spadix, or column, clothed at its base with minute flowers. The stature of this giant from head to foot is 6 feet 9 inches. The spathe is 3 feet deep, 4 feet across; the spadix 5 feet long, 10 inches diameter at the base, narrowing to a blunt point, greenish in the early stage, turning to a drab as it grows older. The bell-like spathe is a maroon-purple, tinged with a violet, velvet-like sheen, indescribably beautiful."

This wonderful plant would thrive well in our grass conservatories in Bengal, if introduced.

The cultivation of the other smaller varieties is the same as that recommended for Arum. On the hills they do well in a stove, and should be treated like Arums.

The three fololwing varieties are to be generally met with:—1, **A. Kingii**; 2, **A. Lacourii**, and 3. **A. Rivierii**.

Ampelopsis.

A genus of *Vitaceæ*, native of North America, and closely allied to, and strongly resembling, **Cissus**. The variety met with in this country, **A. Veitchis (Tricuspidata)**, is a moderate climber, with handsome leaves, and curious tendrils, which adhere to supporting bodies by small sucker-like processes formed at the extremities. It is grown in the grass conservatory, in a light rich soil. Propagated by layers in the rains.

On the hills, keep in a glass-house with moderate heat.

Alternanthera.

Very dwarf, shrubby plants, with coloured leaves, well suited for borders and edgings, for which they are largely used. N. O. *Amarantaceæ*. The leaves are small, and vary in colour from a deep bottle green to blood-red and purple. Propagated by cuttings in the rains. The varieties in cultivation are: **A. amabilis**: **A. discolour**; **A. paronychoides**; and **A. spatulata**.

Not grown on the hills.

Aneilema.

A. nudiflora.—A small shrub, native of India, and belonging to the N. O. *Commelynaceæ*. There are several species, but this appears to be the only one met with in this country. It is somewhat similar to **Tradescantia**, except that the leaves are not variegated. Propagated by cuttings and layers in the rains. Requires no particular care in cultivation.

On the hills, does well in a green-house.

Aspidistra.

A. punctata.—A stemless plant of the N. O. *Liliaceæ*, and native China and Japan. Bears small blue flowers, which, however, are produced under the surface of the earth. It is owing to this peculiarity that it is cultivated in the grass conservatory. A light sandy soil suits it. Propagated by division of the bulbs in February.

On the hills keep in a green-house and treat same as other bulbous plants of the Lily order.

Beaucarnia.

A genus of *Liliaceæ*, native of Mexico, with straight arborescent Dracæna-like stems, and remarkable for the bulbiform swelling at the base. Grown in light rich soil in the same way as the Dracæna, and propagated by cuttings in sand during the rains. The varieties in cultivation are :—

B. recurvata (formerly known under the name of **Pincenectita Tuberculata**). With straight stem and strap-like leaves. Sends up during the rains a panicle about a yard long, bearing a multitude of very small, white fragrant flowers. **B. glauca** (or **stricta**). With plain glaucous leaves, straight and erect, resembling an aloe, and bears its small, greenish-white flowers in a panicle like the foregoing.

May be grown on the hills in a green-house in the same way as **Dracænas**.

Bertolonia.

A genus of dwarf, sprawling pot-plants, natives of Brazil, belonging to the N. O. *Melastomaceæ*, with heart-shaped, ciliated leaves having raised ribs. The two cultivated varieties, **B. Marchandi,** and **B. Marchandi superba,** have beautiful velvety leaves; and are very ornamental when grown in the grass conservatory, in a light, rich, sandy soil. Propagated by cuttings in sand under a hand-glass during the rains.

On the hills grow in a hot-house.

Bonapartia.

B. juncea.—A graceful plant with drooping grass-like leaves, of the N. O. *Bromeliaceæ*, and grown in the grass conservatory forms an interesting ornament. Loves a loose soil, made up of leaf mould, sand and crocks.

On the hills grow in the hot-house.

Brexia.

A genus of small trees belonging to the N. O. *Saxifragaceæ*, and natives of Madagascar, having healthy leaves. The variety cultivated in the grass conservatory, **B. chrysophylla,** has handsome leaves of a golden hue. A light sandy soil, with old mortar or concrete, suits it best. Propagated by cuttings in sand under a hand-glass during the rains. It sometimes bears a fruit of the size of a small orange.

On the hills grow in a hot-house.

Campsidium.

A very handsome genus of the N. O. *Bignoniaceæ*, for some time represented by only one species from Chili. Another variety has lately been introduced into this country, **C. filicifolium**, by a Calcutta nurseryman, which is remarkable for its fern-like foliage, and tubular flowers of an orange colour. It is a remarkably handsome plant, and grows to perfection in the grass conservatory. A light, rich soil, composed of a large proportion of leaf-mould, suits it. Propagated by layers in the rains.

It may, perhaps, be grown on the hills in a hot-house.

Camœnsia.

C. maxima.—An extensive climber of striking beauty, native of tropical West Africa. Only lately introduced into Calcutta. Belongs to the N. O. *Leguminoseæ*, sub-order *Sophoreæ*. Has trifoliate leaves, similar to the **Bignonia Venusta**, and bears in pendulous racemes of six to eight flowers, cream-coloured and veined, frilled at the margin, where they are tinted with golden yellow. It is justly described as a gorgeously beautiful climber, and has few rivals. The calyx tube is about six inches long, with the sepals recurving like a Fuchsia, below which is the drooping corolla, about three inches long, each petal being frilled. It has as yet only been grown in a grass conservatory; but it is possible that it may be got in time to grow in the open. A soil with plenty of leaf-mould and sand suits it best. Propagated by layers put down in the rains.

It has not yet been introduced in the hills, but would, doubtless do well in the stove.

Caraguata.

C. Cardinalis.—A genus of *Bromeliaceæ*, natives of Central America, Columbia, and the West Indies, and only recently introduced into this country by a Calcutta nurseryman. Grown chiefly for the beauty of its leaves. Rather difficult of cultivation. A soil made up of leaf-mould, sand, and charcoal suits it best. Requires plenty of water, and is seen to best advantage during the rains.

Centradenia.

A genus of *Melastomaceæ*, natives of Mexico and Central America with ovate and lanceolate ribbed leaves. Lately introduced into this country, and cultivated in the grass conservatory for the beauty of their foliage, as well as their flowers. The two varieties in cultivation are **C. grandiflora** with large, rose-coloured flowers, and

C. rosea, with smaller rose-coloured flowers. Propagated by cuttings in sand.

Centrosolenia.

A genus of ornamental leaved *Gesneraceæ*, natives of British Guiana and represented by this solitary species. It is a prostrate plant, with thick leathery leaves, heart-shaped, and suited only for rockeries. Grown in a pot filled with some leaf-mould, sand, and pieces of old mortar the size of walnuts, it thrives well and puts forth its white tubular flowers. Propagates itself by sending out stems with notches which throw out roots, and may then be removed. The varieties are **C. bractascens, C. glabra, C. picta, C. metallica,** and **C. vittata.**

On the hills grow in the stove.

Chamaclædon.

C. rubens.—A handsome aroid (*Araceæ*) from Borneo, with ovate leaves, about four inches long and 2½ broad, of a bronzy green colour and dotted with minute stellate scales on the upper surface, and of a dull wine-red colour beneath. A soil made up of leaf-mould, sand, and old mortar or concrete, with plenty of drainage, suits it best. Can only be grown in the grass conservatory, where it is at its best during the rains. Propagated by division and cuttings in sand under glass.

On the hills grow in a stove.

Chameranthemum.

C. Beyrichii variegatum.—A garden variety of recent introduction, native of Brazil, and belonging to the N. O. *Acanthaceæ*. A small shrub, with handsome variegated leaves, in the way of **Eranthemum.** Propagated by cuttings during the rains. Thrives best in a light rich soil made up of leaf-mould, sand, and loam.

On the hills grow in a stove.

Cienkowskia.

C. Kirku.—A handsome shrub, native of Natal, of the N. O. *Scitaminaceæ*. It is closely allied to **Kœmpferia.** It bears exceedingly pretty flowers, of a soft purplish rose colour, with a golden spot in the centre, and are borne in a many-flowered scape. A light rich soil suits it, and can only be grown in the grass conservatory.

On the hills grow in a hot-house.

Curculigo.

A genus of extra-tropical South African shrubs, some natives of India, belonging to the N. O. *Hypoxidaceæ*, and remarkable chiefly for their grassy ribbed and palm-like leaves, over two feet long. They thrive well in the grass conservatory, in a light loose soil. May be propagated by cuttings, division and seed during the rains. The varieties in cultivation are:—**C. Sumatrina, C. recurvata, C. recurvata variegata,** and **C. metallica.**

On the hills grow in a hot-house.

Corynostylus.

C. albiflorus.—A handsome tropical American climber, of the N. O. *Violaceæ*, with polished serrated entire leaves and large handsome white flowers. Propagated by layers during the rains. On the hills groow in a stove.

Curmeria.

A genus comprising two dwarf species of handsome-leaved plants. natives of New Granada, belonging to the N. O. *Araceæ*. Cultivated, in the same way as Alocasia, in the grass conservatory, outside of which it will not live. Propagated by division and seed (which are occasionally borne) in the rains. On the hills a stove is necessary. The two varieties in cultivation are:—**C picturata,** a stemless plant, with broad-spreading, heart-shaped leaves of a beautiful green, having a broad silver-gray band running down the centre; and **C. Wallisii,** a very handsome plant, with stemless spreading leaves from one to two feet long and sometimes a foot broad, with irregular dark-green maculations, and broad patches of pale, yellowish green which turn to a grey as the leaves mature. A striking object when planted on a rockery covered over with Selaginellas.

Cyanophyllum.

A very handsome genus of *Melastomaceæ*, natives of tropical America, with large, noble-looking lustrous leaves from one to two feet long and of ornamental character. A light, rich soil, with free drainage, suits them best. They grow well in a grass conservatory. Propagated by cuttings in sand under a hand-glass, put down during the rains; also by division just before repotting in February and March. The varieties in cultivation in this country are:—

C. Assamicum.—Native of Assam, with ribbed leaves of a dark green on the upper surface and reddish underneath.

C. Bowmanni.—Somewhat different from the last in having leaves of larger size and handsome. Native of tropical America.

C. magnificum.—Native of tropical America, and one of the handsomest plants in cultivation, with leaves from one to two feet in length, and nine to twelve inches wide, tapering to a point. The upper surface of a beautiful velvety green, the raised ribs being white, while the underside is of a fine reddish purple. Grows to a height of about four feet.

C. spectandum —Native of tropical America, differing very little from C. Bowmanni.

On the hills it will be advisable to treat these plants as stove exotics. None of the species are cultivated for their flowers, which are insignificant.

Cyrtodeira

Very dwarf, handsome-leaved plants of the N. O. *Gesneraceæ*, natives of New Granada, but almost naturalized in this country, where they thrive to perfection in a grass conservatory. A soil composed of leaf-mould, sand and garden loam, rendered loose and porous by pieces of old mortar or concrete, suits them best. The roots are very fine and delicate, and when once planted cannot be disturbed without suffering serious injury. They do very well on rockwork and in hanging baskets.

Propagated by offshoots, which the plants throw off largely, and also by inserting a leaf in pure sand under a hand-glass during the rains.

The following varieties are in cultivation :—1, **C. chontalensis** ; 2. **C. fulgida,** and 3. **C. metallica.** They all resemble each other closely, and can scarcely be distinguished from Gesneras, except that the leaves are variegated.

Dasylirion.

A small genus belonging to the N. O. *Bromeliaceæ*, and natives chiefly of Mexico. The plants are dwarf, with short stems, from which spring a bunch of narrow linear variegated leaves in the way of the variegated pineapple, which they much resemble. The leaves droop gracefully and terminate in a bunch of fibres at the point.

Cultivation and propagation same as for Ornamental Bromeliads.

The following varieties are in cultivation :—1, **D. acrotrichum,** 2, **D. glancophyllum,** and 3, **D. recurva.**

Delabechia.

D. rupestris.—This is the Bottle-Tree of North-Eastern Australia, and is the only representative of the genus. Its sole recommendation

for a place in a garden collection is the singular shape of the stem, which is bulged out in the middle like a barrel. The tree is of moderate size, with lance-shaped leaves, and bears short panicles of insignificant flowers. The stem abounds in a mucilaginous substance which is said to resemble Gum Tragacanth.

Propagated by seed, which it bears abundantly.

Dianella.

A very pretty genus of dwarf Australian shrubs of the N. O. *Liliaceæ*, but only represented in this country by a single species, which thrives well in a soil composed of equal parts of leaf-mould, sand, and loam.

Propagated by division of the roots after the leaves die down in the winter.

D. purpurea.—Native of tropical Asia, of dwarf growth with grass-like leaves, and bearing a drooping panicle of pretty violet-purple flowers, which are followed by berries of the same colour.

Dieffenbachia.

A very extensive genus of Arads (N. O. *Araceæ*), natives chiefly of tropical South America and the West Indies, but almost naturalized in this country, where they thrive to perfection in our glass conservatories.

All the species are remarkable for the beautiful colouring of their leaves. They are at their best during the rainy season, when they can be easily propagated by cuttings in sand under a hand-glass.

There are over forty varieties in cultivation, but the six described below are, perhaps, the best for general purposes and for the ornamental character of their leaves :—

1. **D. Bowmanni.**—An old established favourite, with bold spreading leaves over a foot long and eight inches wide, of a light green, picked out with darker blotches. One of the best.

2. **D. Chelsoni.**—A handsome plant, with dark satiny green leaves, marked with a grey band and feathered about one-third across each half of the blade, the surface of which is spotted and blotched with bright yellow green.

3. **D. Jenmanii.**—Leaves of a bright shining green, the lateral nerves of which have a milk-white band, while the surface is interspersed with white spots. A very handsome variety.

4. **D. Magnifica.**—This is, perhaps, the handsomest of the species. The leaves are ovate acuminate, 12 to 15 inches long and from

4 to 5 inches wide; dark green in colour, and thickly covered with large, irregular blotches of pale yellow. It is a perfectly distinct species.

5. **D. Regina.**—This is a very distinct species, with oblong leaves of a greenish white, blotched with pale green, and having a narrow margin of a darker shade.

6. **D. splendens.**—This is a recent introduction. The leaves are oblong, acuminate and recurve gracefully; the ground colour is a deep velvety bottle-green, with an ivory white midrib and freely blotched with white. A very handsome plant.

For those who desire to cultivate a larger number of varieties, a complete list is subjoined of most of the varieties offered by Calcutta nurserymen :—

D. amabilis; amœna; Amazonica; Baraquiniana; Bausei; Braziliensis; Carderii; costata; delecta; eburnea; flavovirens; gigantea; grandis; illustris; imperator; insignis; lanceolata; Leopoldii; maculosa; marmorata; nebulosa; nitida; nobilis; Pearcei; picta; princeps; Shuttleworthii; superbiens; rex; triumphans; vittata; volutina, and Weiri superba.

Dorstenia.

A genus of *Moraceæ*, composed of herbaceous shrubs, natives mostly of tropical America. Cultivated for the ornamental character of their leaves. A few of the species have been introduced into this country, and thrive well in the grass conservatory, and also in the open in Lower Bengal. They are propagated easily by cuttings in sand during the rains. An open soil composed of leaf-mould, sand, and loam will suit them. The two following are found in Calcutta gardens :—**D. argentia,** with silvery leaves; and **D. Braziliensis,** with heart-shaped leaves.

Dorganthes.

A genus of imperfect bulbous plants, belonging to the N. O. *Amaryllidacea* and bearing a strong resemblance to the Aloe. Natives chiefly of New Holland. A straight stem, measuring about twenty feet, springs up from the base leaves, like the Aloe, with this difference, that the stem is clothed with small leaves. It bears at the summit a tuft of flowers, varying in colour from crimson to scarlet. Cultivation same as for the Amaryllis. Propagated by suckers and division. **D. excelsa,** bearing crimson flowers, is a fine object in a grass conservatory when in bloom. **D. Palmeri** is also an ornamental species. Both of these are found in Calcutta gardens.

Drymonia.

A family of dwarf shrubs and climbers, *N. O. Gesneraceæ*, inhabiting moist places. Most of them are South American species. They bear large, bell-formed flowers, like Gesneras. They delight in a light, rich soil. Cuttings strike readily in sand during the rains. There are several varieties in cultivation ; but **D. marmorata** and **D. turialvæ** are perhaps the best of the lot.

Galphimia.

A genus of dwarf Mexican shrubs : referred to botanically as an Anagram of the *N. O. Malpighiaceæ*. There are about half a dozen species, bearing yellow flowers mostly. Propagated by cuttings of the ripened wood in October. Not particularly ornamental. **G. nitida,** and **G. glauca** are found in Indian gardens.

Griffinia.

This is a South American genus of *Amaryllidaceæ*, and consists of dwarf bulbous plants. The leaves are broad, oblong, and petiolated, and strongly marked with nerves. Being bulbous, they should be treated in the same way as the Amaryllis, only the soil must be very light and open. Propagated by offsets of the bulbs. **G. Hyacinthina** is the handsomest of the species, and bears a many-flowered umbel of lovely blue flowers, resembling the Hyacinth. It is not uncommon in Calcutta gardens.

Gynura.

A very extensive genus of the *N. O. Compositeæ* (*Asteraceæ*), and closely allied to **Senecio,** many of which are cultivated as annuals in the cold months. The herbaceous species are some of them remarkable for the beauty of their leaves. They are natives of India and tropical Asia generally. **G. bicolor** (*syn.* **aurantica**), is a beautiful species, introduced from the Moluccas. The leaves are dark purple on the under surface, and bears fine orange coloured flower-heads, disposed in loose corymbs. A light rich soil suits it. Propagated by cuttings in sand during the rains.

Homalonema.

A genus of ornamental-leaved plants belonging to the *N. O. Araceæ*, and strongly resembling Alocasias. Natives chiefly of India, with

heart-and arrow-shaped leaves. Cultivation same as for Alocasia. The following varieties are found in Calcutta gardens :—**H. aromatica**, native of Chittagong ; has an aromatic smell, the roots of which are used by the natives for medicinal purposes ; **H. cordatum**, with large heart-shaped leaves and a white spathe, and **H. rubescens**, a recent introduction. All of them grow well in the grass conservatory.

Laportea.

This is a recent introduction, the genus being new even to European botanists. The plants belong to N. O. *Urticaceæ*, and are widely distributed, some being natives of India. The variety cultivated in our Indian grass conservatories is **L. Schomburgkii versicolor**, a handsome shrub, remarkable for the variegated beauty of its leaves. It is a native of this country, and thrives to perfection in the grass conservatory. Propagated by cuttings in sand during the rains.

Ledenbergia.

L. Rosea.—This is a South American shrub of recent introduction with alternate, petiolate entire leaves, and bears its rose-coloured flowers in axillary racemes. It belongs to the N. O. *Phytolaccaceæ*, and has only one other species. A light vegetable soil, with sand, suits it best. Propagated by cuttings in the rains.

Lindenia.

L. rivalis.—A handsome shrub, native of Guatemala, belonging to the N. O. *Cinchonaceæ*, and is the only species of the genus. It is about three feet high, and bears large, white, tubular-expanded flowers. A light, rich soil suits it, and it thrives well in our grass conservatories, where it opens its flowers in the hot and rainy months. Propagated by cuttings in the rains.

Mackaya.

M. bella.—This is a most desirable shrub, native of South Africa, where it forms one of the handsomest objects in a South African landscape. It belongs to the N. O. *Acanthaceæ*, tribe *Asystasieæ*. The flowers, from four to six inches long, borne in racemes and pendent, are of a lovely pale lilac. When in bloom, the plant is one mass of lilac. Thrives fairly well in the grass conservatory, in a gravelly soil mixed with leaf-mould and sand. Propagated by cuttings in the rains.

Nidularium.

The genus is composed of dwarf, stemless plants, belonging to the N. O. *Bromeliaceæ*, and natives chiefly of South America. Some of them are considered of sufficient attractiveness to be grown in the grass conservatory. Their only beauty lies in the leaves, which grow in the form of a nest and are coloured. Cultivated in the same way as Bilbergias, and propagated by offshoots in the rains.

The two varieties found in Calcutta gardens are **N. fulgens**, and **N. spectabile**. They are of recent introduction and are considered "rare."

Palisota.

P. Barteri.—A dwarf, ornamental-leaved plant, belonging to the N. O. *Commelynaceæ*, and in habit and appearance resembling Aneilema. Grows fairly well in our grass conservatories. Propagated by cuttings in sand during the rains.

Paullinia.

This is a very extensive genus of South American climbing shrubs, furnished with tendrils. A few species are cultivated for the beauty of their flowers, which are white as a rule, and borne in racemes. They thrive well in our grass conservatories, and are easily propagated either by seed, which they bear abundantly, or by cuttings, in the rains. A light, rich soil suits them best.

The cultivated species have been recently introduced in this country, the following being the best, *viz.*, **P. Hooibrenkii** and **P. thalictrifolia.**

The chief interest of the genus, however, lies in the fact that the **P. sorbilis** yields the famous Guarana, which enters so largely into the dietary of the Amazonian Indians, and which is now also used in medicine by Europeans. The active principle of the plant is identical with the *Theine* of tea.

Pavonia.

This is a small genus of *Malvaceæ*, the species being chiefly of Peruvian origin, although some of them are found growing in a wild state in Southern India. Like most Malvaceous plants, they thrive well in this country, and require very little care in their cultivation. Propagated by seed and cuttings in the rains.

The two varieties worth cultivating are **P. odorata,** native of Southern India, with sweet-scented flowers; and **P. multiflora** (*syn.* **Wiotii**), native of Peru.

Pellionia

A recently named genus, which has been placed under the *N. O. Uricaceæ.* Natives chiefly of tropical Asia, and growing and thriving well in this country. The species grown in our grass conservatories are creeping plants, with curious succulent oval leaves, or rather leaflets, of a greyish hue, with dark green blotches. They are admirably suited for rockeries and hanging baskets, and when so grown, have a fine effect. The plants propagate themselves by throwing out roots wherever the stems touch.

The varieties found in Calcutta gardens are: 1. **P. Daveanana**; 2. **P. Daveanana argentia,** with leaves of silvery hue; and 3. **P. pulchra.**

Peperomia.

This is a very extensive genus of *Piperaceæ*, and varieties are found in various parts of the tropical world, some being natives of India. Their chief claim to notice arises from the peculiar fleshy leaves, which are some times very prettily marked. In shape, the leaves are mostly cordate acuminate, and grow in a bunch, the stems being almost entirely hidden.

A light soil, composed of leaf-mould, sand, loam and old mortar, with free drainage, will grow them to perfection; although the varieties grow well if attached to a stump of palm wood with moss.

The varieties chiefly grown in Calcutta are 1. **P. arifolia**; 2. **P. argyrea**; 3. **P. prostrata**, and 4. **P. Verschaffeltii.**

Phalangium (Anthericum).

The genus so called has now been placed under Anthericum by Bentham and Hooker in their *Genera Plantarum.* The plants belong to the *N. O. Liliaceæ,* and are of dwarf habit, with linear lanceolate, fleshy leaves, springing from the roots, and bear panicles of white flowers. The genus is distributed over Europe, Asia and America, and the varieties in cultivation in this country grow well in the grass conservatory. A light, rich soil suits them best. Propagated by division of the roots, which are fleshy.

The cultivated varieties are: 1. **P. argenteo-linearis**, with leaves striped white; and 2. **P. elegans.**

Philageria.

P. Veitchii.—This is the name given to an interesting hybrid produced in Messrs. Veitch's nursery, by hybridising Philesia

buxifolia and Lapageria rosea. The result was a singular combination of both parents in point of foliage as well as flower. The leaves are neither heart-shaped nor box-shaped, and the flowers are somewhat bell-formed and drooping, of a rosy carmine colour. It may be referred to the *N. C. Philesiaceæ*, to which both its parents belong.

It is of easy culture, and grows well in our grass conservatories, in a light, rich soil. Propagated by cuttings in sand in November.

Philodendron.

Another division of the great *Araceæ* order, comprising mostly creeping plants, with heart-shaped leaves, of an ornamental character. Natives chiefly of tropical America. Cultivation same as for Anthurium; with this difference, that the plants mostly propagate themselves by throwing out roots wherever the creeping stems touch the earth. The most beautiful varieties are:

1. **P. Carderi.**—Native of South America. Leaves heart-shaped, of a dark bottle green with a satiny lustre, the ribs being picked out with bright green lines; under surface of a vinous purple. A most beautiful object when well grown.

2. **P. nobile.**—Also from South America, with abovate lanceolate leaves of a leathery texture; remarkable for the beauty of its inflorescence, the spathe is of a deep carmine in the lower part, and white on the upper, and prettily marked by deep-rose stellate spots.

3. **P. Wallisii.**—This is also from South America, and is a most handsome plant, with large, heart-shaped leaves, the younger ones of a bright yellow-green, spotted with a deeper shade. One of its merits is its compact growth.

The other varieties in cultivation are: 4. **cannœfolium**; 5. **crinipes**; 6. **daguense**; 7. **discolor**; 8. **grandidens**; 9. **grandifolium**; 10. **Lindenianum**; 11. **melanochrysum**; 12. **pertusum**, and 13. **radiatum**.

Phyllanthus.

A genus of *Euphorbiaceæ*, inhabiting tropical America and Asia; several species being indigenous to India. Not very ornamental, except for their curious leaves and habit of growth. Some of the varieties are close allies of Xylophylla, so common in our gardens. Ordinary light, rich soil suits them. Propagated by cuttings in sand during the rains.

The varieties in cultivation are: 1. **P. atropurpureus**, with small, dark, purple flowers; 2. **P. nivosus**, 3. **P. roseo-pictus**, with rose-coloured minute flowers, and 3. **P. Seemannianus**.

Phyllarthron.

P. Comorense.—This is a medium-sized shrub, native of Mauritius, and belonging to the N. O. *Crescentiaceæ.* The leaves are long and narrow, from one to two inches long; and the flowers, which are pink, are borne in racemes. It yields a peculiar white fruit, about the size and shape of the little finger, which is used in Mauritius for making jellies.

In this country it is grown as an ornamental plant, and thrives fairly well. Propagated by cuttings and seed during the rains. Requires no particular treatment.

Phyllotœnium.

P. Lindeni.—This is an ornamental Arad (N. O. *Araceæ*) from New Granada, and was previously known under the name of Xanthosoma Lindeni. The leaves are sagitate, like those of the Caladium; coriaceous in texture, of a dark green; with the ribs and veins of ivory white.

Cultivation same as for Caladium; but having a tuberous rhizome, it is propagated during the rains by dividing this.

Psychotria.

A genus of *Rubiaceæ*, though formerly referred to *Cinchonaceæ.* Natives chiefly of tropical America. The plants are not for any particular beauty. The variety introduced into, an in, this country is **P. cyranicocea**, with funnel-shap Grows well in the grass conservatory in Calcutta.

Ravenia.

This is a genus of *Rutaceæ*, represented by two species, one of them being synonymous with Lemonia spectabilis. The other species, **R. humilis**, bears white flowers; but in other respects resembles Lemonia spectabilis. It is a native of Brazil, but thrives well in the grass conservatory in this country. Propagated by cuttings in the rains. Not particular as to soil.

Rhodea.

R. Japonica.—A curious plant, having all the appearance of an Arad, even in the matter of its seed-vessel, but belonging to the *N. O. Liliaceæ.* Native of Japan, but grows fairly well in our grass conservatories. Bears panicles of white flowers, followed by a tuft of fleshy

looking berries. A light, sandy soil with plenty of drainage suits it. Propagated by seed in the rains.

R. Japonica aureo-variegata.—This is a recent introduction, and an improved variety of the preceding, with handsome leaves, having a golden variegation.

Schismatoglottis.

A genus of dwarf, ornamental-leaved Arads (*N. O. Araceæ*), natives mostly of India and the Indian Archipelago. They are rhizomatous, the leaves springing from the rhizomes, are heart-shaped and of various colours. Admirably suited for rockeries. They love moisture and shade, and grow to perfection in the grass conservatory. A soil composed of leaf-mould, sand, loam, and old mortar or concrete, with free drainage, suits them admirably. Propagated by dividing the rhizomes during the rains.

The following varieties are found in cultivation in Calcutta gardens:—1 **S. cuspata**; 2. **S. Lansbergia**; 3. **S. pulcherra**; 4. **S. decora**; 5. **S. variegata,** and 6. **S. Rubellini.**

Sericographis.

A genus of *Acanthaceæ,* natives chiefly of tropical America, but some varieties are also found in this country. Like most of our ornamental acanthaceous shrubs, these thrive well in the grass conservatory. The variety known as **S. Ghiesbreghtiana** is, perhaps, the most desirable for cultivation. Any ordinary light, rich soil suits it. Propagated by cuttings in the rains.

Simonisia (*Syn.* Beloperone).

A very handsome genus of *Acanthaceæ,* inhabiting tropical America, but thriving admirably in our grass conservatories. The variety mostly found in Calcutta gardens is **S. chrysophlœa,** a beautiful species, with, as its name implies, golden-coloured leaves. A shrub about three feet high, bears in the hot and rainy months, heads of purple flowers. Propagated by cuttings in the rains.

Smilax.

This is an extensive genus extending over a considerable area. It gives the name to the N. O. *Smilaceæ.* It is in fact the botanical name of the Sarsaparilla of medicine. They are mostly climbing shrubs, with leaves something like the sweet-potato. One or two varieties are cultivated as ornamental plants in the grass conservatory, especially **S. macrophylla variegata,** with large, heart-shaped

variegated leaves. Grows in any light soil, and is easily propagated by layers in the rains.

Spathiphyllum.

Dwarf, stemless plants of the *N. O. Araceæ*, remarkable chiefly for the ornamental character of their leaves, which are sagittate (arrow-shaped). The peculiarity about the plants is that the spathe is like a leaf, hence the name. They are natives of tropical America, but thrive well in the grass conservatory. A soil composed of leaf-mould, sand, and old mortar will grow them to perfection.

The following varieties are in cultivation :—1. **S. Bensonii** ; 2. **S. hybridum**, and 3. **S pictum.**

Tydœa.

The plants known under this name are really Achimines, the only difference being in the leaves, which are blotched and mottled. In every other respect they may be regarded as Achimines, and treated as such in point of cultivation.

The varieties cultivated under the name of Tydœa are :—1. **T. aurantica Lindenii** and **zebrina** ; and 2. **T. picta**. There are, however, dozens of gardeners' varieties, bulbs of which may be imported.

Uvaria.

This is a genus of *Anonaceæ*, some of the species of which are natives of India. They are mostly climbers, some of them bearing very fragrant flowers which are insignificant in appearance. They are easy of cultivation, and thrive in any ordinary soil. Propagated by seed and layers in the rains.

U. longifolia and **U. odorata** are natives of India and bear very fragrant flowers. The leaves are linear lanceolate in shape.

Vriesia.

This is a name given to some Brazilian plants of ornamental character, belonging to the *N. O. Bromeliaceæ*. The leaves are quite unlike those of other Bromeliads, and are flattened out, while the flowers are borne in spikes and protected by large, handsome-coloured bracts. Cultivation same as for other Bromeliads. Propagated by offshoots.

There are three species found in Calcutta gardens, viz. :—1. **V. bellula** ; 2. **V. fenestratis**, and 3. **V. splendens (speciosa).**

END.

INDEX.

INDEX TO ENGLISH-NAMES OF PLANTS

AND

GENERAL INDEX.

ADAM'S NEEDLE, 408.
Adjutant's Hedge, 423.
Agricultural and Horticultural Society, 3.
Akee, 210.
Alkekengi, 309.
Alligator Pear, 243.
Allspice, 471, 596.
——— Carolina, 471.
——— Japan, 471.
Almond, 281.
——— Indian, 281.
American Aloe, 375.
——— Marmalade, 260.
Animals, 54.
Animal Manures, 14.
Annuals, 285.
——— List of, 205.
——— On the Hills, 287.[286
——— Sowing, season for, mode of, 284.
——— Soil for, 287.
——— Transplanting, 288.
——— Watering, 287.
Ants, 50, 64.
Apple, 251.
——— Elephant, 226.
——— Love, 164.
——— Malay, 270.
——— Mammee, 214.
——— Otaheite, 241.
——— Rose, 270.
——— Star, 259,
——— Thorn, 308, 531.
——— Wood, 226.
Apricot, 248.
Arabian Chamomile, 326.
Arbor Vitæ, 419.
Arnotto, 432.
Arrowroot, 125.
Artichoke, 168.
——— Jerusalem, 168.

ASPARAGUS, 130.
Asparagus Bean, 157.
Aubergine, 164.
Auricula-flowered Ipomœa, 540.
Avocado Pear, 243.

BABOONS, 54.
Bâer, 257.
Bale Fruit, 227.
Balloon Vine, 296.
Balm of Gilead, 553.
Balsams, 299.
Bamboo, 350.
——— Sacred, 445.
Banâna, 188.
Baobâb, 208.
Barbadoes Cherry, 214, 445.
——— Gooseberry, 600.
——— Pride, 480.
——— Sweet William, 310.
Basil, 550.
Bastard Ipecacuanha, 333.
BEANS—
Asparagus, 149.
Broad, 159.
Chevaux-de-frise, 150.
Dwarf, 152.
Egyptian, 274.
French, 160.
Goa, 159.
Lima, 161.
Scarlet Runner, 160.
Bearded Hawkweed, 330.
Beds, 23.
Beet, 152.
Beetles, 52.
Belladonna Lily, 368.
Bell-Flower, 582.
Bell-Glassses, 46, 79.
Bell-Pepper, 162.
Bencoolen Nut, 275.

Bengal Quince, 227.
Bengal Sage, 167.
Berberry, 455.
Betel-Houses, 31.
Betel Nut Palm, 356.
Bhindee, 149.
Birds, 53.
Birdsfoot Trefoil, 472.
Bird's Net Spleenwort, 345.
Bird-Pepper, 162.
Birthwort, 616.
Blood Flower, 533.
Blue Gum Tree, 594.
Bokhara Plum, 250.
Borage, 315.
Borders, grass, 23.
Borecole, 144.
Bottle Brush, 595.
——— Gourd, 136.
Box, 428.
——— China, 458.
Brazil Cherry, 269.
Bread-and-Butter Plant 551.
Bread Fruit, 197.
——— Nut, 198, 275.
——— Jamaica, 274.
Brinjal, 164.
Broad Bean, 159.
Brocoli, 146.
Brussels' Sprouts, 144.
Budding, 92.
Bulbous Plants, 336.
Bullock's Heart, 218.
Bully Tree, 260.
Butterfly Plant, 398.

CABBAGE, 142.
Cabbage Palm, 356.
Cactus, Turk's Cap, 597.
Cajeput Oil-Tree, 535.
Calabash Tree, 563.
Calabrian Soapwort, 301.

Calendar of Operations—
——— For the Plains, 100-109.
——— For the Hills, 109-116
Californian Poppy, 298.
Callimato Tree, 244.
Canary Creeper, 295.
Candle Nut, 275.
Candy Tuft, 291, 292.
Cane, 357.
Canterbury Bell, 582.
Cape Gooseberry, 263.
Cape Jessamin, 612.
Capsicum, 162.
Cardoon, 170.
Caricature Plant, 574.
Carnation, 465.
Carolina Alspice, 471.
Carpenter Insect, 52.
Carrion Plant, 538.
Carrot, 176.
Cashew Nut, 278.
Cassava, 134.
Castor-oil Plant, 425.
Catch-fly, 301.
——— Lobel's, 301.
Caterpillars, 49.
Cauliflower, 145.
Cayenne-Pepper, 162.
Celeriac, 175.
Celery, 173.
Changeable Rose, 441.
Cherimoyer, 219.
Cherry, 250.
——— Barbadoes, 214-445.
——— Brazil, 269
——— Cayenne, 269.
——— Peruvian, 263.
Chestnut—
China, 277.
Chinese, 276.
Moreton Bay, 280.
Spanish, 276.
Water, 282.
Chili, 162.
China Aster, 323.
China Box, 458.
——— Pink, 301-465.
Chinese Air-plant, 397.
Chives, 130.
Cinnamon, 470.
Citron, 235.
——— Fingered, 235.
——— Puncire, 235.
Civit-cat Fruit, 209.
Climate, 7.
Climbing Palm, 364.
Climbing Plants, 336.
Clove, 596.
Clove-scented Echites, 527.
Club Gourd, 139.
——— Mosses, 338.
Cockroaches, 52.
Cockscomb, 304-477.
Cockscomb Coral-Tree, 477.
Cocoa Nut, 272.
Cocoa-Plum, 244.
Coffee, 604.
Colewort, 144.
Collard, 144.
Columbine, 454.
Compost, 19.
Conifers, 417.
Conservatories, and Glass Houses, 30.
Conservatories, Grass, 31.
Conveyance of Plants, means of, 96.
Convolvulus major, 310.
minor, 309.
Coral Plant, 425, 477.
Corn Bluebottle, 329.
Cowa, 215.
Cowa-Mangosteen, 215.
Cowslip, 544.
Cowslip Creeper, 534.
Cream Fruit Tree, 528.
Cress, 142.
Crickets, 52.
Crotons—
Cultivation of, 425-27.
List of, 427.
Crown Imperial, 404.
Crows, 49, 53.
Cucumber, 136.
Cucumber Tree, 243.
Custard Apple, 217.
Cuttings, 76.
American method, 84.
Description of, 77.
Methods of striking and soil, 79.
Season for striking, 76.
Cypress, 420.
——— Vine, Crimson 310.
Weeping, 420.

DAISY, 584.
Dandelion, 170.
Date Palm, 184.
Deadly Poison Plant, 527.
Decorations, 38.
Devil-in-a-Bush, 297.
Devil's Bit, 323.
Drainage, 30.
Durian, 209.

EARTH NUT, 280.
Egg Plant, 164.
Eglantine, 504.
Elephant Apple, 226.
Elephant Creeper, 541.
——— Ear, 423.
——— Food, 467.
Endive, 170.
Engines, Garden, 45.
Evening Primrose, 330, 591.
Everlasting Pea, 474.
Everlastings, 327.

FAN PALM, 184, 358.
Feather Grass, 289.
Fennel, 175.
Fennel Flower, 297.
Ferns, 40, 594.
——— Climbing, 347.
——— Cultivation of, 340.
——— Gold and Silver, 343.
——— Hare's-foot, 346.
——— Royal, 349.
Tree, 346, 348.
Fernery, 34.
Fig, 194.
Fig Marigold, 304, 469.
Filberts, 276.
Flame of the Forest, 480.
Flamboyant, 480.
Flax, Scarlet, 298.
Flos Adonis, 297.
Flower Fence, 480.
Flower Garden, 285, 335.
Flower-stands, 40.
Flying Foxes, 54.
Forget-me-not, 315.
Fork-trowel, 44.
Foxglove, 581.
Frames and Pits, 38.
French Bean, 160.
French Honeysuckle, 307.
French Sorrel, 150.
Fruit Garden, How to Lay out and Stock, 179-184.
Fakeer's Bottle, 136.

GARDEN, CALCUTTA BOTANICAL, 2.
Agri-Horticultural, 3.
Garden Engines, 45.
——— Enemies, 49.
——— laying out of, 20.

GARDEN, NURSERY.

Garden, Nursery, 5.
——— Ootacamund, 2.
——— Private, 2.
——— Saharunpore Botanical, 2.
Gardeners' Garters, 350.
Garland Flower, 382.
Garlic, 129.
Gaybine, 311.
Geranium, 463.
German Aster, 323.
Ginger, 123.
Ginko, 274, 420.
Glass-houses, 30.
Globe Amaranth, 303.
Glory Pea, 474.
Goa-Bean, 159.
Goats, 55.
Goat's-foot Convolvulus, 539.
Goat-Pepper, 162.
Gobbo, 149.
Golden Bartonia, 332.
——— Rod, 584.
Gooseberry, 267.
——— Barbadoes, 601.
——— Cape, 263.
——— Hill, 269.
Gootee, 87.
Grafting, 88.
——— Cleft, 90.
——— Nurseryman, 89.
——— Side, 89.
——— Wax, 91.
——— Wedge, 89.
Granadilla, 207.
Grape Vine, 221.
Grasses, 289, 350.
Grass Borders, 23.
Grass Conservatories, 31.
Ground-Nut, 280.
Ground-Rattan Palm, 362.
Greek Creeper, 477.
Grubs, 52.
Guano, 16.
Guava, 266.
——— Apple, 267.
——— Cattley's, 267.
——— Guinea, 268.
——— Hill, 269.
——— Many-fruited, 268.
——— Pear, 266.
——— Purple-fruited, 267.
——— Red, 267.
——— Strawberry, 268.
Gueldres' Rose, 592.
Gum Cistus, 438.

GUM-TREE.

Gum-Tree, 570.

HAND-GLASSES, 81.
Hanging-baskets, 39.
Hares-foot Fern, 346.
Hawthorn, 491.
Heartsease, 290, 436.
Heart-seed, 290.
Heath, 457.
Hedgehog Thistle, 598.
Hedges, 25.
Heliotrope, 549.
Henbane, 309.
Henna, 519.
Herbaceous perennials, 335.
Hill Raspberry, 255.
Hoeing, 26.
Hog Plum, 242.
Holly, 521.
Hollyhock, 295, 441.
Honey Locust, 486.
Honeysuckle, 591.
——— French, 307.
——— Japan, 614.
——— Trumpet, 614.
Honeywort, 315.
Horse-radish, 141.
Horse-radish Tree, 140.
Hyacinth, 409.
——— Grape, 409.

ICE PLANT, 304.
Icaco, 244.
Implements, 44.
Inarching, 91.
Indian Butterfly Plant, 398.
——— Corn 122.
——— Cress, 294.
——— Fig, 601.
——— Shot, 385.
——— Sorrel, 209.
Indigo, 412.
Insects, 50.
Introduction, 1.
Iris, 376.
Chalcedonian, 376.
English, 377.
Persian, 377.
Spanish, 377.
Widow, 376.
Iron-wood Tree, 447.
Irrigation, 27.
Ivy, 616.
——— Indian, 422.
Ivy-leaf Geranium, 464.

LILY.

JACKALS, 54.
Jack Fruit, 196.
Jack Fruit Nut, 275.
Jacobæa, 328.
Jacobæa Lily, 368.
Jamaica Bread-nut Tree, 274
Jamaica Wild Liquorice, 533
Jamrosade, 270.
Japan Cedar, 420.
Jasmine, 545.
Jasmine, Arabian, 548.
Cape, 612.
Catalonian, 547.
Chili, 527.
Spanish, 525.
Tuscan, 548.
Jerusalem Thorn, 479.
———Artichoke, 168.
Jonquil, 374.
Judas Tree, 486.
Juniper, 419.

KHURRKE, 14.
Kidney Bean, 160, 280.
Kite Flower, 309.
Knight's Star Lily, 369.
Knol Kohl, 147.
Kodalee, 44.
Kohl-rabi, 147.
Koorpee, 44.
Kumquât, 233.

LABELS, 47.
Lady's Finger, 149.
Lady's Slipper, 375.
Langsat, 236.
Lanseh, 236.
Larkspur, 297.
Laurel, 490.
Lavender, 551.
Lawn Mowers, 45.
Lawns, 24.
Layering, 86.
Leaf-mould, 12.
Leek, 129.
Lemon, 234.
——— Burton's, 234.
——— Ningpo, 234.
——— Grass, 351.
Lemon-scented Verbena, 553.
Leopard Flower, 317.
Lettuce, 172.
Lettuce Tree, 467.
Lichee, 211.
Lilac, 530.
Lily, 404.

Lily, African, 406.
——— Belladonna, 368.
——— Day, 406.
——— Jacobæa, 328.
——— Knight's Star, 369.
——— Pig, 354.
——— Swamp, 368. [309.
——— Travellers' Midnight,
——— Water, 448.
Lima Bean, 161.
Lime, 42.
——— Superphosphate of, 17.
Limes, 233.
Liquid Manures, 18.
Logwood, 479.
Longan, 203.
Long-Plum, 257.
Loquat, 254.
Lord Anson's Pea, 307.
Lote-Bush, 275.
Lotus, 277.
Love-apple, 164.
Love-lies-bleeding, 303.
Lumbang Nut, 275.
Lupins, 304, 472.
Lutqua, 204.

MADAGASCAR PERIWINKLE. 524.
Mahogany, 459.
Maiden-hair Fern, 344.
Maize, 122.
Malabar Nightshade, 153.
Mâlees, 5.
Malay Apple, 270.
Mammee Apple, 214.
Mammee-Sapota, 260.
Mandioc, 134.
Mango, 231.
——— Varieties of:—
——— Alphonso, 237.
——— Arbuthnot, 238.
——— Arracan, 238.
——— August, 238.
——— Bangalore, 238.
——— Bombay, 238.
——— China, 237.
——— Davies, 238. [238.
——— De Cruze's Favorite,
——— Goa, 238.
——— Lucknow, 238.
——— Madame, 238.
——— Madras, 238.
——— Malda, 237.
——— Moorshedabad, 238.
——— Peter, 238.
Mangoe, Singapore, 238.
——— Tarse, 238.
Mangosteen, 215.
Manilla Nut, 280.
Manilla Tamarind, 489.
Manures—
——— Animal, 14.
——— Liquid, 18.
——— Mineral, 17.
——— Vegetable, 12.
——— Green, 12.
——— Stable, 14.
Marjoram, 167.
Marvel of Peru, 468.
——— Sweet-scented, 468.
Marigold, 325, 329.
——— African, 325.
——— French, 326.
Mask Flower, 320.
Matee, 521.
Mauritius Raspberry, 255.
Melon, 199.
Melon-shaped Cactus, 597.
Midnapore Creeper, 540.
Mignonette, 298.
Millefoil, 586.
Mineral Manures, 17.
Mint, 166.
Mock Orange, 602.
Monkey Bread, 208.
——— Flower, 321.
——— Jack, 198.
Monkey's Puzzle, 418.
Moonbeam, 253.
Moon Flower, 310.
Morel, 122.
Morning Glory, 310.
Morton Bay Chestnut, 479.
Mountain Ebony, 484.
Moving Plant, 415.
Mulberry, 193.
——— Indian, 194.
Mullein, 319.
Mushroom, 120.
Mussel-shell Creeper, 457.
Mustard, 148.
Myrtle, 596.
Mysore Raspberry, 255.

NASEBERRY, 260.
Nasturtium, 294.
Nectarine, 248.
Needle Cocoanut, 273.
Neeseberry, 260.
Nerinee, 44.
Nets, 46, 54.
Night-blooming-Tree-of-Sadness, 549.
Night-blowing Cereus, 599.
Night-soil, 15.
Nipple Cactus, 598.
Norfolk Island Pine, 418.
Nurserymen, 5.
Nuts, 272.

OCHRO, 149.
Oil-cake, 14.
Okra, 149.
Old Maid, 524.
Oleander, 526.
Oleaster, 193.
Olive, 263.
Onion, 128.
Orange, 227.
——— Otaheite, 238.
——— Seville, 227.
——— Sylhet, 227.
Orchid House, 35 391.
Orchids, 386.
——— Cultivation of, 387.
——— Distribution of Species, 387. [387.
——— Division of Species,
——— Natural Conditions, 387.
——— On the Hills, 391.
——— Propagation, 389.
Otaheite Apple, 241.
——— Cashew, 270.
——— Gooseberry, 199.

PÆONY, 454.
Pak-o, 274.
Palms, 355.
Palma Christi, 425.
Palmyra Tree, 184.
Pampas Grass, 350.
Pansy, 290.
Papaw, 205.
Paraguay Tea, 521.
Parrots, 54.
Parrot's Beak, 474.
Parsley, 175.
Parsnip, 176.
Passion Flower, 433.
Paths, 21.
Peach, 245.
——— Double Chinese, 489.
Peacock Flower, 480.
Pear, 253.
Peas, 154.
Peat, 13.

Pelican Flower, 617.
Pepper Bell, 162.
——— Bird, 162.
——— Cayenne, 162.
——— Goat, 162.
Peppermint, 166.
Periwinkle, 524.
Persian Wheel, 32.
Peruvian Cherry, 263.
Peruvian Daffodil, 374.
Phaora, 44.
Pheasant's Eye, 297.
Physic Nut, 425.
Picotee, 465.
Pigeon's Dung, 15.
Pig's Dung, 15.
Pig Lily, 354.
Pimento, 560.
Pine Apple, 185.
——— Striped Leaf, 340.
Pistachio Nut, 278.
Pitcher Plant, 428.
Pits, Glazed, 38.
Plantain, 188.
——— Arrakan, 192.
——— Cavendish, 191.
Planting, 74.
Plants—Bulbous, 336.
——— Climbing, 336.
——— Conveyance of, 96.
——— Division of, 85.
——— Fragrant, 337.
——— Ornamental, 337.
——— Suited for pots, 336.
——— Tuberous-rooted, 336.
——— Verandah, 336.
Plum, 249.
——— Bokhara, 250.
——— Cocoa, 244.
——— Date, 261.
——— Long, 257.
——— Natal, 262.
——— Puneeâla, 206.
——— Round, 257.
Pomegranate, 264.
——— Double-flowered, 595.
——— dwarf, 595.
Pompelnose, 231.
Pompoleon, 231.
Poppy, 297.
——— Californian, 298.
——— French, 298.
Porcupines, 55.
Portugal Laurel, 490.
Potato, 162.
——— Chinese, 132.
Potato, Sweet, 165.
Pot-culture, 66.
Pots, 40, 66.
——Plants for, 336.
——Potted Plants, watering of, 70.
——drainage of, 73.
Potting, Operation of, 68.
——Season for, 67.
——Soil for, 70.
Prickly Cactus, 601.
Prickly Pear, 601.
Primrose, 543.
Primrose Creeper, 534.
Primrose Willow, 591.
Prince's Feather, 303.
Propagation, 85.
——— By Eyes, 85.
——— By Division, 85.
Pruning, 94.
Pudding-pipe Tree, 481.
Pumelo, 231.
——— Amoy, 232.
——— Canton, 232.
Pumpkin, 136.
Puneeâla, 206.

QUAKING GRASS, 289.
Queen of the Orchids, 398.
Quince, 250.
——— Bengal, 227.

RABBITS, 54.
Radish, 148.
Rain Season, 7.
Rain Tree, 489.
Rake, 44.
Raspberry, 255.
——— Hill, 255.
——— Mauritius, 255.
——— Mysore, 255.
Ratan, 357.
Rats, 54.
Rattlewort, 305.
Red Bean Tree, 477.
——— Gourd, 139.
——— Head, 533.
——— Spider, 50.
——— Valerian, 322.
Rhubarb, 150.
Ribbon Grass, 350.
Rice-paper Plant, 616.
Ring Pots, 41.
Rocket Larkspur, 297.
Ronsa Grass, 351.
Roots, Pruning of, 95.
Rose, 491.
Roses—Cultivation, 491-498.
——Descriptive List, 501-516.
——Exhibition of, 498-501.
Rose Apple, 270.
——— bay, 526.
——— changeable, 441.
——— of Heaven, 301.
Roselle, 209.
Rue, 461.

SACRED LOTUS, 450.
Safflower, 330.
Saffron, 378.
Sage, 167.
——— Bengal, 167.
——— Jerusalem, 553.
——— Wild, 555.
St. John's Wort, 448.
Salsify, 171.
Salt, 17.
Sand, 11.
Sandal Wood, 617.
Sandwich Island Climber, 467.
Sandwich Is. Tea Plant, 413.
Sapota, 260.
Sapodilla, 260.
Savanna Flower, 527.
Scabious, 323, 588.
Scandent Shrubs, 336.
Scarlet Runner, 160.
Schools for Mâlees, 5.
Scorzonera, 111.
Scotch Kale, 144.
Screw Pine, 354.
Screw Tree, 439.
Scythe, 46.
Sea Daffodil, 373.
Sea Kale, 148.
Sea-side Potato, 539.
Seasons, 7.
Seeds, Acclimated, 56.
——— American, 62.
——— Annuals, of, 59.
——— Cape of G. Hope, 62.
——— English, 62.
——— Failure of, 63.
——— Gathering of, 58.
——— Govt. Gardens, 60.
——— Imported, 60.
——— Packing of, 60.
——— Shrubs, of, 58.
——— Soaking of, 66.
——— Sowing of, 64.
——— Storing of, 59.
——— Vegetables, of, 58.
——— Vitality of, 59.

Seetee, 14.
Sensitive Plant, 487.
Shaddock, 232.
Shades, 46.
Shallot, 130.
Shoe Plant, 442.
Shovel, 44.
Shrubs, Ornamental, 335.
Shrubs, scandent, 336.
Siriss, 488.
Slips, 77.
Snail Flower, 477.
Snake Gourd, 139.
Snapdragon, 320, 579.
Snowberry, 608.
Snowdrop, 367.
Snowflake, 367.
Soapsuds, 71.
Soils, 11.
Soot, 42.
Soursop, 218.
Southernwood, 588.
Sow Bread, 544.
Spade, 44.
Spanish Arbour Vine, 539; Bayonet, 408; Broom, 472; Jasmine, 525; Nectarine, 244.
Sparrows, 54, 64.
Spearmint, 166.
Speckboom, 467.
Spiderwort, 414.
Spikenard, 582.
Spinach, 152.
Spinous Lily Thorn, 611.
Sprouting Broccoli, 146.
Squash, 138.
Squirrels, 54.
Stable Manure, 14.
Star Apple, 259.
Star of Bethlehem, 409.
Stock, Brompton, German and Tenweek, 291.
——— Virginia, 292.
Stock, Yellow, 292.
Strawberry, 256.
Strawberry Tree, 457.
Subaltern's Butter, 243.
Sugar-Palm, 361.
Sunflower, 324.
Swallow-wort, 533.
Swamp Lily, 368.
Swan River Daisy, 323.
Sweet Alison, 291.
——— Bâbool, 488.
——— Bay, 471.
Sweet Briar, 504,
——— Calabash, 207.
——— Lime, 234.
——— Pea, 306.
——— Potato, 165, 540.
——— Sop, 218.
——— Sultan, 329.
——— William, 465.
Sword Flag, 377.
Syringe, 45.

TALLIES, 46.
Tamarind, 245.
Tamarisk, 436.
Tangier Pea, 307.
Tank Soil, 12.
Tapioca, 134.
Tassel Flower, 328.
Tea Plant, 447.
Thieves, 55.
Thorn-Apple, 308.
Thrift, 542.
Thyme, 168.
Tiffany Cloth, 46.
Tiger Flower, 77.
Toad Plant, 538.
——— Flax, 320.
Toads, 53.
Tobacco, 308.
Tomato, 164.
Tomi-tomi, 207.
Torch-Thistle, 599.
Tous les Mois, 126.
Transplanting, 75.
——— Trowel, 44.
Trowel, Transplanting, 44.
——— Fork, 44.
Travellers' Tree, 379.
Trees, Ornamental, 335.
Trellis, 38.
Trident, 44.
Truffle, 122.
Trumpet Honeysuckle, 614.
Tube Rose, 406.
Tuberose, Creeping, 534.
Tulip, 404.
Turf, charred, 13.
Turk's-cap Cactus, 597.
Turmeric, 124, 380.
——— Wild, 381.
Turnip, 147.
Turnip-rooted Cabbage, 147.
——— Celery, 175.

UMBRELLA TREE, 597.
Underground Bean, 280.

VALERIAN, 322.
Vanille, 126.
Vegetable Manures, 12.
Vegetables, culinary, 119.
Venus' Looking-glass, 321.
——— Purse, 319.
——— Slipper, 403.
Verandah, plants for, 33.
Verbena, 316.
——— Lemon-scented, 553
Violet, 290, 436.
Viper's Bugloss, 315.
Virgin's Bower, 452,
Virginian Stock, 292.
Voa Vanga, 271.

WALLFLOWER, 292, 438.
Walnut, 275, 277.
Wampee, 226.
Wardian cases, 96.
Water-Bean, 450.
——— Caltrops, 282.
——— Cress, 140.
——— Lily, 448,
——— Melon, 204.
Watering of plants, 70.
Watering-pots, 45, 71.
Wax Palm, 358.
——— Plant, 535.
Weeds, 55.
Weeping Cypress, 420.
——— Willow, 421.
Wells, 27.
West Coast Creeper, 534.
White Ants, 51.
——— Gourd, 136.
——— Horse, 610.
Wild Liquorice, 478.
——— Olive, 193.
Wine Palm, 357.
Wood Apple, 226.
——— Ashes, 13.
Worms, 53.

YAMS, 132.
Yams, Malacca, 132.
——— New Zealand, 132.
Yellow Sultan, 329.
——— Water-bean, 450.
Yew, 421.

ZEBRA-PLANT, 385.
Zedoary—
——— Long, 380.
——— Red, 381.

INDEX TO LATIN NAMES

OF

ORDERS, GENERA AND SPECIES.

Abelia, 615.
triflora, 615.
Abelmoschus—
esculentus, 149.
Abroma, 439.
augusta, 439.
Abronia, 303,
arenaria, 303.
umbellata, 303.
Abrus, 478.
precatorius, 478.
Abutilon, 444.
Bedfordianum, and others, 444.
Acacia, 487,
Catechu, and others, 487—88.
Acalypha, 290, 424.
densiflora, and others, 424—25.
ACANTHACEÆ, 318, 567.
Acanthus, 573.
ilicifolius, 573.
Achillea, 586.
Millefolium, 586.
nobilis, 586.
Achimenes, 560.
Achras—
Sapota, 260.
Achyranthes, 469.
alopecuroides, 469.
Acroclinium, 327.
album, 327.
roseum, 327.
Actiniopteris, 345.
Adansonia—
digitata, 208.
Adenanthera, 621.
Adhatoda, 575.
cydoniæfolia, 575.
Adiantum, 344.
Adonis, 297.
autumnalis, 297.
Æchmea, 365.

Ægle—
Marmelos, 227.
Aerides, 400.
affine, and others, 400.
Ærua, 469.
sanguinolenta, 469.
Æschynanthus, 563.
grandiflorus, and others, 563.
Æschynomene—
Sesban, 26.
Agapanthus, 406.
umbellatus, 406.
AGARICACEÆ, 120.
Agaricus, 120.
Agathosma, 460.
Agati, 474.
grandiflora, 474.
Agave, 375.
Americana, 375.
variegata, 375.
Ageratum, 323.
Mexicanum, 323.
Aglaia, 459.
odorata, 459.
Aglaonema, 621.
Akebia, 429.
quinata, 429.
Aleurites—triloba, 275.
Allamanda, 521.
cathartica, and others, 521—22.
Allium, 129, 408.
Ascalonicum, 130.
Cepa, 128.
fragrans, 408.
Porrum, 129.
sativum, 129.
Schænoprasum, 130.
Alocasia, 351.
Aloe, 407.
Abysinnica, and others, 407—8.

Alonsoa, 320,
incisifolia, 320.
Aloysia, 553.
citriodora, 553.
Alpinia, 382.
Allughas, and others, 383.
Alsophila, 346.
Alstonia, 526.
nereifolia, 526.
Alströmeria, 375.
psittacina, 375.
Alternanthera, 623.
Althæa, 295, 441.
rosea, 295, 441.
AMARANTACEÆ, 151, 303, 469.
Amaranthus, 151.
caudatus, 303.
Gangeticus, 151.
hypochondriacus, 303.
oleraceus, 151.
salicifolius, 303.
tricolor, 303.
AMARYLLIDACEÆ, 367.
Amaryllis, 367.
Amherstia, 483.
nobilis, 483.
Amorpha, 473.
Amorphophallus, 622.
Amoora, 621.
Ampelopsis, 623.
fruticosa, 473.
Amphilophium, 566.
Mutisii, 566.
Amygdalus, 245, 489.
communis, 281.
Persica, 245.
var. lævis, 248.
var. fl. pl., 489.
ANACARDIACEÆ, 236, 278.
Anacardium—
occidentale, 278.
Anæctochilus, 402.
Dawsonianus, and others, 402.

ANANASSA.

Ananassa, 185, 365.
sativa, 185.
striatifolia, 185, 365.
Andropogon, 351.
Martini, 351.
Schœnanthus, 351.
Aneilema, 623.
Anemone, 453.
coronaria, 453.
Japonica, 453.
Angelonia, 579.
grandiflora, 579.
Angræcum, 400.
superbum, and others, 400.
Aniseia, 539.
media, 539.
Anisochilus, 551.
carnosus, 551.
Anona—
Cherimolia, 219.
muricata, 218.
reticulata, 218.
squamosa, 217.
ANONACEÆ, 217, 451.
Anthericum, 410.
vespertinum, 410.
Andreanum, and others, 415—416.
Anthurium, 415.
Anthyrium, 347.
Antigonon, 467.
insignis, 467.
leptopus, 467.
Antigramma, 347.
Antirrhinum, 320, 579.
majus, 320, 579.
Aphelandra, 574.
cristata, 574.
fulgens, 574.
tetragona, 574.
APIACEÆ, 173, 332, 615.
Apium—
graveolens, 173.
var. Rapaceum, 175.
Apluda, 351
aristata, 351.
APOCYNACEÆ, 262, 521.
AQUIFOLIACEÆ, 521.
Aquilegia, 454.
vulgaris, 454.
ARACEÆ, 123, 351.
Arachis hypogæa, 280.
Aralia, 616.
Guilfoylei, and others 616
ARALIACEÆ, 615.

ARAUCARIA.

Araucaria, 417.
Bidwelli, and others, 417—18.
Arbutus, 457.
Ardisia, 544.
crenulata, and others, 544
Arduina bispinosa, 262.
Areca, 356.
Arenga, 357.
Argyreia 540.
argentea, 540.
cuneata, 541.
nervosa, 541.
splendens, 541.
Aristolochia, 617.
acuminata, 617.
Brasiliensis, 617.
caudata, 617.
labiosa, 617.
ARISTOLOCHIACEÆ, 617.
Armeria, 542.
cephalotes, 542.
Artabotrys, 451.
odoratissimus, 451.
Artemisia, 588.
Abrotanum 588.
lactifolia, 588.
odoratissima, 588.
Arthrostemma, 593.
lineatum, 593.
ARTOCARPACEÆ, 196, 274.
Artocarpus—
incisus, 197, 275.
integrifolius, 196, 275.
Lacoocha, 198.
Arum, 351.
Dracunculus, 351.
pictum, 351.
Arundina, 395.
bambusifolia, 395.
Arundo, 350
Donax, 350.
versicolor, 350.
Asclepias, 533.
arborescens, 533.
Curassavica, 533.
Mexicana, 533.
ASCLEPIADACEÆ, 532.
Asparagus, 411.
acerosus, and others, 411
officinalis, 130.
racemosus, 131, 411.
Aspidistra, 623.
Aspidium, 346.
Asplenium, 345.

BEGONIACEÆ.

Aster, 583.
annuus, 583.
Chinensis, 323.
sp. 583.
ASTERACEÆ, 168, 323, 583.
Astrapæa, 440.
Wallichii, 440.
Astrocaryam, 358.
argentium, 358.
Asystasia, 571.
Coromandeliana, 571.
formosa, 571.
Aucuba, 616.
Japonica, 616.
AURANTIACEÆ, 225, 458.
Averrhoa—
Bilimbi, 242.
Carambola, 243.
Azalea, 457.

Babiana, 377.
BALSAMINACEÆ, 299.
Bambusa, 350.
aureo-variegata, 350.
nana, 350.
Banksia, 470.
Banisteria, 446.
argentea, 446.
laurifolia, 446.
Barleria, 572.
buxifolia, and others, 572.
Barosma, 460.
Barringtonia, 602
acutangula, 602.
racemosa, 602.
speciosa, 602.
BARRINGTONIACEÆ, 602.
Bartonia, 332.
aurea 332.
Basella—,
alba, 153.
cordifolia, 153.
BASELLACEÆ, 153.
Batatas, 540.
edulis, 165, 540.
paniculata, 540.
Bauhinia, 484.
acuminata, and others, 485.
Beaucarnia, 624.
Beaumontia, 525.
grandiflora, 525
Begonia, 429.
argyrostigma, and others, 430-32.
BEGONIACEÆ, 429.

BELLIS.

Bellis, 584.
perennis, 584.
Beloperone, 575.
nervosa, 575.
oblongata, 575.
verrucosa, 575.
BELVISIACEÆ, 592.
Benincasa—
cerifera, 136.
BERBERIDACEÆ, 454.
Berberis, 455
Bertolonia, 624.
aristata, and others, 455.
Beta—
vulgaris, 152.
Bignonia, 564.
amœna, and others, 564-65.
BIGNONIACEÆ, 564.
Billbergia, 365.
Bixa, 432.
Orellana, 432.
Blechnum, 347.
Bletia, 395.
hyacuthina, 395.
verecunda, 395.
Bligbia—
sapida, 210.
Bonopartia, 624.
BORAGINACEÆ, 315.
Borago, 315.
officinalis, 315.
Borassus—
flabelliformis, 184.
Boronia, 460.
Boucerosia, 537.
crenulata, 537.
umbellata, 537.
Brachycome, 323.
iberidifolia, 323.
Brassavola, 395.
glauca, 395.
cucullata, 395.
Brassica—
oleracea, 142.
rapa, 147.
BRASSICACEÆ, 140, 291, 438.
Brexia, 624.
Briza, 289.
gracillis, 289.
maxima, 289.
BROMELIACEÆ, 185, 365.
Bromheadia, 401.
palustris, 401.
Brosimum—
Alicustrum, 274.
Broughtonia, 394.
sanguinea, 394.

BROWALLIA.

Browallia, 318.
elata, 318.
Brownea, 482.
Antiguiensis, and others, 483.
Brunsfelsia, 577.
Americana, and others, 577.
Bryophyllum, 437.
calicinum, 437.
Buchanania—
latifolia, 279.
Buddlea, 581.
globosa, and others, 581.
Bugainvillea, 467.
glabra, and others, 468.
Buxus, 428.
Chinensis, 428.
sempervirens, 428.
BYTTNERIACEÆ, 439.

Cacalia, 328, 589.
carnosa, 589.
coccinea, 328.
hieraceoides, 589.
CACTACEÆ, 596.
Cæsalpinia, 481.
coriaria, and others, 481.
CÆSALPINEÆ, 479.
Caladium, 353.
Calamus, 357.
Calandrinia, 302.
umbellata, 302.
Calendula, 329.
officinalis, 329.
Calanthe, 401.
masuca, and others, 401.
Calathea, 384.
bicolor, and others, 385.
Calceolaria, 319, 578.
pinnata, 319.
Calliandra, 488.
brevipes, and others, 488.
Callicarpa, 558.
cana, 558.
lanceolaria, 558.
purpurea, 558.
Callichroa, 326.
platyglossa, 326.
Calliopsis, 324.
filifolia, var. Burridgi, 324.
tinctoria, 324.
Callirhoe, 296.
digitata, 296.
Callistemon, 595.
linearis, 595.
salignus, 695.

CASSIA.

Callistephus, 323.
hortensis, 323.
Calodendron, 460.
Calonyction, 309.
grandiflorum, 310.
muricatum, 309.
Calophylum, 447.
inophyllum, 447.
Calotropis, 532.
gigantea, 532.
Hamiltoniana, 532.
CALYCANTHACEÆ, 471.
Calycanthus, 471.
floridus, 471.
Calysaccion—
longifolium, 216.
Camæensia, 625.
Camarea, 446.
lucida, 446.
Camellia, 446.
Japonica, 446.
Campanula, 321, 582.
Loreyi, 321.
Lychnitis, 582.
CAMPANULACEÆ, 321, 582.
Campidium, 625.
Canavalia—gladiata, 156.
Canna, 385.
Achiras, & others, 385-86.
edulis, 126.
CAPPARIDACEÆ, 438.
Capparis, 438.
horrida, 438.
tryphylla, 438.
CAPRIFOLIACEÆ, 614.
Capsicum—
annuum, 162.
baccatum, 162.
fastigiatum 162.
frutescens, 162.
grossum, 162.
Caraguata, 625.
Caralluma, 537.
fimbriata, 537.
Cardiospermum, 296.
halicacabum, 296.
Carica papaya, 205.
Carissa carandas, 262.
Carludorria, 355.
Carthamus, 330.
tinctorius, 330.
CARYOPHYLLACEÆ, 301, 465.
Caryophyllus, 596.
aromaticus, 596.
Caryota, 357.
Cassia, 481.
alata, & others, 481-82.

Castanea—
Chinensis, 276.
vesca, 276.
Castanospermum, 280, 479.
Australe, 280, 479.
Casuarina, 421
muricata, 421.
CASUARINACEÆ, 421.
Catesbæa, 611
spinosa, 611.
Cattleya, 394.
Aclandiæ, and others, 391
CEDRELACEÆ, 459.
CELASTRACEÆ, 521.
Celosia, 304.
cristata, 304.
Centaurea, 329.
Americana, 329
Candidissima, 330.
Clementii, 330.
Cyanus, 329.
gymnocarpa, 330.
moschata, 329
suaveolens, 329.
Centradenia, 592, 625.
floribunda, 592.
Centranthus, 322
macrosiphon, 322.
Centropogon, 582.
fastuosus, 582.
Centrosema, 476
Plumieri, 476.
Virginianum, 476.
Centroslenia, 626.
Cerasus, 250, 490
Jenkinsii, 250.
Lauro-cerasus, 490.
Lusitanica, 490.
vulgaris, 250.
Cerbera, 523.
fruticosa, 523.
Cercis, 486.
Canadensis, 486
Siliquastrum, 486.
Cereus, 599.
eriophorus, and others, 594.
Cerinthe, 315.
major, 315.
retorta 315.
Ceropegia, 537
Gardneri, 537.
Ceroxylon, 358.
Cestrum, 530
aurantiacum, 530.
fœtidissimum, 530.

Chænostoma, 320.
polyanthum, 320.
Chamaclædon, 626.
Chamærops, 357.
Chameranthemum, 626.
Cheilanthes, 344.
Cheiranthus, 292, 438.
Cheiri, 292, 438.
CHENOPODIACEÆ, 152.
Chimonanthus, 471.
fragrans, 471.
Chiococca, 608.
racemosa, 608.
Chrysanthemum, 327, 586.
carinatum, 326.
——— aureum, 327.
coronarium, 327
Japonicum, 327.
Segetum grandiflorum, 327.
Sinense, 586.
Indicum, 586.
CHRYSOBALANACEÆ, 244.
Chrysobalanus—
Icaco, 244.
Chrysophyllum, 259, 520.
Cainito, 259, 520.
Cicca—
disticha, 199.
Cichorium—
endivia, 170.
Cienkowskia, 626.
CINCHONACEÆ, 271, 603.
Cineraria, 328, 588.
Acanthifolia, 328.
Maritima, 328.
Cinnamomum, 470
Zeylanicum, 470.
Cipura 376
Cissus, 455.
discolor, and others, 455.
CISTACEÆ, 438
Cistus, 438.
ladaniferus, 438.
Citharoxylon, 555.
subserratum, 555.
Citrus, 227, 459
Citrus, acida, 233.
Aurantium, 227.
decumana, 231.
Japonica, 233.
Limetta, 234
Limonum, 234.
Citrus, medica, 235.
vulgaris, 228.

Cladanthus, 326.
Arabicus, 326.
Clarkia, 331.
elegans, 331.
pulchella, 331.
Clausena, 458.
heptaphylla, 58.
Clematis, 421
brachiata, 421.
Cadmia, 421
Flammula, 421.
Gouriana, 452.
Viticella, 452.
Cleome, 294.
viscosa, 294.
Clerodendron, 555.
fallax, and others, 555-57
Clianthus, 305, 474.
Dampieri, 305, 474.
puniceus, 474.
Clintonia, 321.
pulchella, 321.
Clitoria, 475.
erecta, and others, 475-76
Clivia, 375.
nobilis, and others, 375
CLUSIACEÆ, 214, 447.
Cobæa, 542.
scandens, 542.
Coccoloba, 467.
macrophylla, 467.
Cochlearia—
Armoracia, 141.
Cochlospermum, 438.
Gossypium, 438.
Cocos—
nucifera, 272.
Weddeliana, &c., 358.
Codiæum, 395.
latifolium, 395.
longifolium, 396.
pictum, 395.
variegatum, 396, &c.
Cœlogyne, 393.
cristata, and others, 393-94
Coffea, 580.
Coffea, Arabica, 604.
Bengalensis, 604.
Colebrookia, 552
oppositifolia, 552
ternifolia, 552.
Coleus, 551
Collinsia, 320.
bicolor, 320.
Collomia, 312.
coccinea, 312.

COLOCASIA.

Colocasia, 352.
antiquorum, 123.
odarata, 352.
Colvillea, 481.
racemosa, 481.
COMBRETACEÆ, 281, 589.
Combretum, 589.
acuminatum, and others, 589—90.
COMMELYNACEÆ, 414.
Congea, 558.
azurea, 558.
CONVOLVULACEÆ, 165, 309, 538.
Convolvulus, 309, 539.
pentanthes, 539.
tricolor, 309.
Cookia—punctata, 226.
Cordia, 588.
Sebestena, 538.
CORDIACEÆ, 538.
Cordyline, 413.
ensifolia, and others, 413.
CORNACEÆ, 616.
Correa, 460.
CORYLACEÆ, 276.
Corylus—
Avellana, 276.
Corynostylus, 627.
Corypha, 358.
Cosmos, 325.
bipinnatus, 325.
Costus, 383.
argyrophyllus, and others, 383-84.
Crambe—
maritima, 148.
Crassula, 437.
miniata, 437.
nitida, 437.
CRASSULACEÆ, 437.
Cratagus, 491,
Crescentia, 563.
acuminata, 563.
Cujete, 563.
CRESCENTIACEÆ, 563.
Crinum, 370.
amœnum, and others, 370.
Crocus, 378.
sativus, 378.
Crossandra, 573.
infundibuliformis, 573.
Crossostephium, 588.
artemisiodes, 588.
Crotalaria, 305.
juncea, 305.

CROTON.

Croton, 425—27.
Crowea, 460.
Cryptomeria, 420.
Japonica, 420.
Cryptostegia, 532.
grandiflora, 532.
Cucumis—
Melo, 199.
Momordica, 204.
sativus, 136.
utilissimus, 137.
Cucurbita—
Citrullus, 204.
maxima, 139.
Melopepo, 138. [199.
CUCURBITACEÆ, 135, 519,
Cuphea, 307, 519.
platycentra, 519.
purpurea, 307.
Cupressus, 420.
funebris, 420.
torulosa, 420.
sempervirens, 420.
Curculigo, 627.
Curcuma, 380.
comosa, and others, 381.
longa, 124.
Curmeria, 627.
Cyanophyllum, 594, 628.
Burmanni, 594.
magnificum, 594.
Cyanotis, 414.
vittata, and others, 414.
Cyathea, 346.
CYCADACEÆ, 364.
Cycas, 364.
Cyclamen, 544.
Cydonia, 250, 490.
Japonica, 490.
vulgaris, 250.
Cymbidium, 400. [400.
aloifolium, and others,
Cynara, cardunculus, 170,
Scolymus, 168.
Cynodon—
dactylon, 24.
Cyperus—
hexastachyus, 25.
Cypripedium, 403.
concolar, and others, 403.
Cyrtanthera, 574.
Pohliana, 574.
aurantiaca, 574.
Cyrtanthus, 372.
Cyrtoceras, 535.
reflexum, 535.

DIANTHUS.

Cyrtodeira, 628.
Cyrtopera, 396.
flava, 396.
Cytisus, 422.

DACRYDIUM, 421.
elatum, 421.
taxifolium, 421.
Dædalacanthus, 571.
splendens, 571.
Dæmonorops, 358.
Dahlia, 584.
superflua, 584.
Dalbergia, 478.
Sisso, 478.
Dalechampia, 424.
Roezleana, and others, 424.
Daphne, 469.
Fortuniana, 469.
viridiflora, 469.
Dasylirion, 628.
Datura, 308, 531.
alba, 308.
chlorantha, 309.
fastuosa, 309.
sanguinea, 531.
suaveolens, 531.
Daucus—
Carota, 176.
Davallia, 346.
Deanstœdtia, 348.
Delabechia, 628.
Delima, 452.
sarmentosa, 452.
Delphinium, 297.
ajacis, 297.
consolida, 297.
Dendrobium, 392.
aggregatum, and others, 392—93.
Desmanthus, 486.
punctatus, 486.
Desmodium, 475.
gyrans, 475.
Desmoncus,, 364.
Deutzia, 602.
scabra, 602.
Dianella, 411, 629.
nemorosa, 411.
Dianthus, 301, 465.
barbatus, 465.
caryophyllus, 465.
Chinensis, 301, 465.
Heddewigi, 465.
laciniatus, 465.

Dicerma, 475.
pulchellum, 475.
Dichorisandra, 414.
ovata, and others, 414.
Dicksonia, 348.
Dictamnus, 460.
Fraxinella, 460.
Dictyoglossum, 848.
Dictyosperma, 359.
Didiscus, 332.
cæruleus, 332.
Dieffenbachia, 629.
Dielytra, 454.
spectabilis, 454.
Digitalis, 581.
Dillenia, 220, 452.
speciosa, 220, 452.
DILLENIACEÆ, 220, 452.
Dioscorea—
alata, 132.
atropurpurea, 132.
fasciculata, 132.
globosa, 132.
Japonica, 132.
purpurea, 132.
rubella, 132.
sp., 132.
DIOSCOREACEÆ, 132.
Diosma, 460.
Diospyros—
Kaki, 261.
Dipladenia, 528.
Diplothemium, 359.
DIPSACEÆ, 323, 583.
Dipterocanthus, 569.
ciliatus, 569.
Dodonæa, 445.
Burmanniana, 445.
dioica, 445.
Dolichos—
Sinensis, 157.
Dombeya, 439.
acutangula, and others, 439.
Doodia, 348.
Dorganthes, 630.
Dorstenia, 630.
Dracocephalum, 316, 552.
Canariense, 553.
Moldavicum, 316.
Dracæna, 412—13.
Drymonia, 631.
Drimea, 410.
revoluta, 410.
DRUPACEÆ, 245, 281, 489.
Dryandra, 470.
Drymoglossum, 343.
Drymophlæus, 361.
Drynaria, 348.
Duranta, 557.
Ellisii, 558.
Plumieri, 557.
Durio—zibethinus, 209.

EBENACEÆ, 261.
Eccremocarpus, 567.
scaber, 567.
Echinocactus, 598.
Echidne and others, 598.
Echites, 527.
carvophyllata and others, 527.
Echium, 315.
EHRETIACEÆ, 549.
ELÆAGNACEÆ, 193, 422.
Elæagnus, 193, 422.
conferta, 193.
dulcis, 422.
Emblica—officinalis, 199.
EPACRIDACEÆ, 457.
Epacris, 457.
Epidendrum, 394.
ciliare, and others, 394.
Epiphyllum, 600.
alatum, 600.
Hookeri, 600.
truncatum, 600.
Eranthemum, 575.
bicolor, and others, 575—76.
Erica, 457.
speciosa, 457.
ERICACEÆ, 457.
Eriobotyra—Japonica, 254.
Eriococcus, 428.
glaucescens, 428.
sp., 428.
Erysimum, 292.
Arkansanum, 292.
Perofskianum, 292.
Erythrina, 476.
Bellangerii, and others, 476—77.
Erythrochiton, 460.
Braziliensis, 460.
Escallonia, 601.
ESCALLONIACEÆ, 601.
Eschscholtzia, 298.
Californica, 298.
Eucalyptus, 594.
Eucharidium, 331.
concinnum, 331.
Eucharis—
Amazonica, and others, 373.
Eugenia, 269, 571.
Michelii, 269.
Pimenta, 596.
ugnea, 596.
Zeylanica, 596.
Euonymus, 520.
garcinifolia, 520.
variegata, 520.
Eupatorium, 583.
asperum, 583.
fœniculaceum, 583.
odoratum, 583.
sp., 583.
Euphorbia, 423.
Bojeri, 423.
jacquiniflora, 423.
splendens, 423.
EUPHORBIACEÆ, 134, 199, 275, 290, 423.
Euryale, 448.
ferox, 448.
Eurycles, 372.
Amboinensis, and others, 372.
Eustrephus, 411.
angustifolius, 411.
Euterpe, 359.
Eutoca, 313.
viscida, 313.
Wrangeliana, 314.
Exacum, 307.
tetragonum, 307.
Excœcaria, 424.
bicolor, 424.

FABA—
vulgaris, 159.
FABACEA, 154, 245, 277, 441.
Felices, 340.
Feronia—
elephantum, 226.
Ficus—
Carica, 194.
eburnea, 422.
repens, 422.
Filicium, 445.
decipiens, 445.
Fittonia, 573, 577.
argyroneura, and others 573.

Flacourtia—
cataphracta, 206.
inermis, 207.
FLACOURTIACEÆ, 206, 432.
Flemingia, 478.
Chapper, 478.
strobilifera, 428.
Fœniculum—
officinale, 175.
Forsythia, 530.
viridissima, 530.
Fourcroya, 375.
cantala, 375.
Fragraria—
vesca, 256.
Franciscea, 578.
confertifolia, and others, 578.
Frederika, 566.
Guillaumi, 566.
Fritillaria, 404.
Fuchsia, 591.
FUMARIACEÆ, 454.
Funkia, 406.
subcordata, 406.

GAILLARDIA, 585.
picta, 585.
Galanthus, 367.
nivalis, 367.
Galphinia, 631.
Garcinia—
Cowa, 215.
Mangostana, 215.
Gardenia, 612.
citriodora, and others, 612—13.
Gaura, 331.
Lindheimeri, 331.
Geissomeria, 573.
aurantiaca, 573.
GENTIANACEÆ, 307, 498.
Geonoma, 359.
GERANIACEÆ, 463.
Geranium, 463.
Nepalense, 463.
Gesnera, 559.
Douglasi, and others, 559.
GESNERACEÆ, 318, 559.
Geum, 517.
atrosanguineum, 517.
Gilia, 312.
achilleæfolia, 312.
capitata, 312.
tricolor, 312.

Ginoria, 519.
Americana, 519.
Gladiolus, 377.
Gleditschia, 486.
triacantha, 486.
Gleichenia, 347.
Globba, 380.
spathulata, 380.
subulata, 380.
Gloriosa, 405.
superba, 405.
Gloxinia, 562.
maculata, 562.
Gnidia, 470.
eriocephala, 470.
Godetia, 331.
Lindleyana, 331.
roseo-alba, 331.
rubicunda, 331.
Goldfussia, 571.
anisophylla, and others, 571.
Gomphocarpus, 533.
fruticosus, 533.
Gomphostemma, 553.
melissæfolium, 553.
Gomphrena, 303.
globosa, 303.
GRAMINACEÆ, 122, 289, 350, 598.
Grammatophyllum, 401.
Finlaysonianum, 401.
Graptophyllum, 574.
hortense, 574.
pictum, 574.
Grevillea, 470.
buxifolia, 470.
robusta, 470.
Grewia—
Asiatica, 210.
sapida, 210.
Griffinia, 631.
Grislea, 519.
tomentosa, 519.
GROSSULARIACEÆ, 601.
Guilandina—
Bonduc, 26.
Gustavia, 603.
augusta, 603.
Gymnogramma, 343.
Gymnostachyum, 573.
Zeylanicum, 573.
Gynerium, 350.
argenteum, 350.
Gynura, 631.

HABRANTHUS, 368.

Habrothamnus, 530.
fasciculatus, 530.
Hæmanthus, 372.
virescens, and others, 372.
Hæmatoxylon, 479.
Campechianum, 479.
Hakea, 440.
HALORAGACEÆ, 282.
Hamelia, 609.
patens, 609.
sphœrocarpa, 609.
Hamiltonia, 608.
azurea, 608.
suaveolens, 608.
Hedera, 616.
Helix, 616.
Hedychium, 382.
angustifolium, and others, 382.
Hedysarum, 307.
coronarium, 307.
Heimia, 518.
myrtifolia, 518.
Helianthus, 324.
annuus, 324.
argenteus, 325.
argyrophyllus, 325.
Californicus, 324.
grandiflorus, 324.
Texanus, 325.
tuberosus, 168.
Helichrysum, 327.
Heliconia, 379.
buccinata, and others, 379.
Helicteres, 439.
Isora, 439.
Heliophila, 292.
arabioides, 292.
Heliotropium, 549.
Peruvianum, 549.
Voltaireauum, 549.
Hemerocallis, 406.
fulva, 406.
Hemionitis, 343.
Henfreya, 569.
scandens, 569.
Hepatica, 453.
Hexacentris, 569.
coccinea, 569.
Hibiscus, 296, 410.
Africanus, 296.
calisureus, 296.
collinus, 442.
giganteus, 296.

HIBISCUS.

Hibiscus—
Jerroldianus, 443.
heterophyllus, 442.
Lampas, 442.
lilliflorus, 443.
Lindleyi, 296.
mutabilis, 441.
rosa Sinensis, 442.
sabdariffa, 209.
Syriacus, 442.
tortuosus, and others, 442—43.
Higginsia, 611.
Ghiesbreghtii, 611.
Hippeastrum, 369.
Hiptage, 446.
Madablota, 446.
Hoffmannia, 611.
Holmskioldia, 553.
coccinea, 553.
Holostemma, 532.
Rheedii, 532.
Homalonema, 631.
Hovenia—
dulcis, 259.
Hoya, 535.
bella, and others, 535—36.
Hunnemannia, 293.
fumariæfolia, 293.
Hyacinthus, 409.
Orientalis, 409.
Hydrangea, 518.
Japonica, 518.
—— variegata, 518.
mutabilis, 518.
HYDRANGEACEÆ, 518.
Hydrocera, 300.
triflora, 300.
HYDROPHYLLACEÆ, 313, 542.
Hymenocallis, 373.
speciosa, 374.
Hymenodium, 348.
Hyophorbe, 359.
Hyoscyamus, 309.
niger, 309.
HYPERICACEÆ, 448.
Hypericum, 448.
Chinense, 448.
Elegans, 448.
pallens, 448.
patulum, 448.
Hypolepsis, 348.

IBIRIS, 291.
odorata, 291.
umbellata, 292.

ILEX.

Ilex, 521.
Aquifolium, 521.
Paraguayensis, 521.
Imantophyllum, 375.
cyrtanthifolium, 375.
miniatum, 375.
Impatiens, 299.
Balsamina, 299.
Imperata—
cylindrica, 25.
Indigofera, 472.
atropurpurea, 472.
decora, 473.
violacea, 473.
Inga, 489.
hæmatoxylon, 489.
Ipomœa, 310, 539.
dasysperma, and others, 539—40.
hederacea, 310.
limbata, 311.
purpurea, 310.
rubro-cærulea, 310.
Ipomopsis, 12, 541.
————, elegans, 12, 541.
Iresine, 469.
aureo-reticulata, and others, 469.
IRIDACEÆ, 376, 596.
Iris, 376.
Chinensis, and others, 376.
Ismene, 374.
calathina, 374.
Itea, 602.
Virginica, 602.
Ixia, 378.
flexuosa, and others, 378.
Ixora, 604.
alba, and others, 604—8.

JACQUINIA, 545.
aurantiaca, 545.
ruscifolia, 545.
Jambosa, 270, 596.
alba, 271.
aquea, 271.
Malaccensis, 270, 596.
vulgaris, 270.
JASMINACEÆ, 545.
Jasminum, 545.
angustifolium, and others, 545—48.
Jatropha, 425.
integerrima, 425.
multifida, 425.
panduræfolia, 425.

LANTANA.

Jonesia, 484.
Asoca, 484.
JUGLANDACEÆ, 277.
Juglans—
regia, 277.
Juniperus, 419.
aurea, and others, 419.
Jussiæa, 591.
villosa, 591.
Justicia, 576.
Betonica, and others, 576

KÆMPFERIA, 381.
Galanga, and others, 381.
Kalanchoe, 437.
heterophylla, 437.
laciniata, 437.
varians, 437.
Kalmia 458.
Kaulfussia, 330.
amelloides, 330.
Kennedya, 476.
Kentia, 360.
Kerria, 517.
Japonica, 517.
Kigelia, 564.
pinnata, 564.
Klugia, 318.
Notoniana, 318.
Kölreuteria, 444.
paniculata. 444.
Koniga, 291.
maritima, 291.
Korthalsia, 360.

LABIATEÆ, 166, 316, 550.
Lablab—
cultratum, 158.
vulgare, 158.
Lachenalia, 410.
Lactuca—
sativa, 172.
Lælia, 394.
anceps, and others, 394.
Lafoensia, 519.
Vandelliana, 519.
Lagenaria—
vulgaris, 136.
Lagerströmia, 519.
elegans, 520.
Indica, 519.
Reginæ, 520.
Lansium—
domesticum, 236.
Lantana, 555.
Camara, and others, 555.

LAPORTEA.

Laportea, 632.
LARDIZABALACEÆ, 429.
Lastræa, 348.
Latania, 360.
Lathyrus, 306, 474.
latifolius, 474.
Magellanicus, 307.
odoratus, 306.
Tingitanus, 307.
LAURACEÆ, 243, 470.
Laurus, 471.
nobilis, 471.
Lavandula, 551.
spica, 551.
Lawsonia, 519.
alba, 519.
Ledenbergia, 632.
Leea, 456.
sanguinea, 456.
LEGUMINOSÆ, 280, 471.
Lemonia, 460.
spectabilis, 460.
Leontodon taraxicum, 170.
Lepidium—
sativum, 142.
Leptodermes, 609.
lanceolata, 609.
Leptosiphon, 312.
densiflorus, 312.
Leucojum, 367.
æstivum, 367.
Licula, 360.
LILIACEÆ, 128, 404.
Lilium, 404.
auratum, and others, 405.
Limatodes 402.
rosea, 402.
Limnanthes, 295.
Douglasii, 295.
LINACEÆ, 298, 461.
Linaria, 320.
Lindenia, 632.
Linum, 298, 461.
grandiflorum, 298.
tetragynum, 461.
trigynum, 461.
Livistona, 357.
Loasa, 332.
aurantiaca, 332.
nitida, 332.
LOASACEÆ, 332.
Lobelia, 322, 582.
compacta, 322.
Cavanillesi, 322.
Erinus, 322.

LOBELIA.

Lobelia—
pumilla, 322.
radicans, 582.
ramosa, 322.
speciosa, 321.
LOBELIACEÆ, 321, 582.
Lomaria. 349.
Lonicera, 614.
diversifolia, and others, 614.
Lophospermum, 579.
scandens, 579.
Lotus, 472.
Jacobæus, 472.
Lourea, 475.
Vespertilionis, 475.
Lucuma,—
mammosa, 260.
Luffa—
acutangula, 135.
Lupinus, 304, 472.
Hartwegi, 305.
hirsutus, 304.
hybridus, 305.
luteus, 305.
Menziesi, 305.
mutabilis, 305.
nanus, 305.
Luvunga, 459.
scandens, 459.
Lycopersicum esculentum, 154.
LYCOPODIACEÆ, 338.
Lycopodium, 338.
Lycoris, 370.
Lygodium, 347.
LYTHRACEÆ, 307, 578.

MAKAYA, 632.
Macrozamia, 365.
Madia, 326.
elegans, 326.
Mæsa, 544.
racementosa, 544.
Magnolia, 450.
fuscata, and others, 450—51
MAGNOLIACEÆ, 450.
Malcomia, 292.
maritima, 292.
Malope, 295.
trifida, 295.
Malpighia, 214, 445.
coccifera, 445.
glabra, 214, 445.
urens, 445.

MERIANDRA.

MALPIGHIACEÆ, 214, 445.
MALVACEÆ, 149, 295, 441, 597.
Malvaviscus, 443.
arboreus, 443.
Mammea—
Americana, 214.
Mammillaria, 598.
longimamma, and others, 598.
Mandevilla, 527.
suaveolens, 527.
Manettia, 610.
cordifolia, 610.
Mangifera—Indica, 236.
Manihot—
utilissima, 134.
MARANTACEÆ, 125, 384, 596.
Maranta, 384.
arundinacea, 125.
albo-lineata, and others, 384.
Marica, 376.
humilis, and others, 376.
Martinezia, 361.
Martynia, 317.
diandra, 317.
fragrans, 317.
lutea, 317.
Matthiola, 291.
annua, 291.
Maurandya, 579.
Barclayana, 579.
Medinilla, 593.
vagans, 593.
Melaleuca, 594.
Cajiputi, 594.
Melastoma, 593.
Malabathricum, 593.
sanguineum, 593.
MELASTOMACEÆ, 592.
Melia, 459.
sempervirens, 459.
MELIACEÆ, 236, 459.
Melocactus, 597.
erectus, 597.
Melodinus, 522.
monogynus, 522.
Memecylon, 594.
capitellatum, 594.
tinctorium, 594.
Mentha, 166, 524.
auricularia, 552.
piperita, 166.
viridis, 166.
Meriandra—
Bengalensis, 167.

MESEMBRYACEÆ.

MESEMBRYACEÆ, 304, 469.
Mesembryanthemum, 304, 469.
cordifolium, 304, 469.
pomeridianum, 304.
tricolor, 304.
crystallinum, 304.
Mesua, 447.
ferrea, 447.
Meyenia, 569.
erecta, 569.
Hawtayneana, 569.
Michelia, 451.
Champaca, 451.
Micromelum, 458.
Integerrimum, 458.
Millingtonia, 566.
hortensis, 566.
Mimosa, 457.
brevipenna, 487.
pudica, 487.
sensitiva, 487.
MIMOSEÆ, 486.
Mimulus, 321.
speciosus, 321.
Mimusops, 261, 521.
Elengi, 521.
Kauki, 261.
Mirabilis, 468.
Jalapa, 468.
longiflora, 468.
Momordica, 468.
Cogea—
Charantia, var. muricata, 135.
Monstera—
deliciosa, 192.
MORACEÆ, 193, 422.
Morchella—
esculenta, 122.
MORINGACEÆ, 140.
Moringa.
Pterygosperma, 140.
Mormodea, 403.
Morus—
Indica, 194.
multicaulis, 194.
nigra, 193.
Mucuna—
nivea, 156.
Munronia, 459.
Javanica, 459.
Murraya, 458.
exotica, 458.
Sumatrana, 458.
Murucuja, 435.
ocellata, 435.

MUSA.

Musa, 188.
Africana, 192.
Arakanensis, 192,
Chinensis, 191.
rubra, 191.
sapientum, 190.
MUSACEÆ, 188, 379.
Muscari, 409.
botryoides, 409.
Mussænda, 613.
corymbosa, 614.
frondosa, 614.
macrophylla, 614.
Myosotis, 315.
palustris, 315.
MYRSINACEÆ, 544.
MYRTACEÆ, 264, 594.
Myrtus, 596.
communis, 596.
tomentosa, 269, 596.

NANDINA, 454.
domestica, 454.
Napoleona, 592.
imperialis, 592.
Narcissus, 374.
Jonquilla, 374.
Tazetta, 374.
Nardostachys, 582.
Jatamansi, 582.
Nasturtium—
officinale, 140.
NELUMBIACEÆ, 277, 450.
Nelumbium, 277.
luteum, 450.
speciosum, 277, 450.
Nemesia, 320.
floribunda, 320.
Nemophila, 313.
atomaria, 313.
discoidalis, 313.
insignis, 313.
maculata, 313.
NEPENTHACEÆ, 428.
Nepenthes, 428.
distillatoria, and others, 429.
Nephelium—
Lichi, 211.
Longanum, 213.
Nephrodium, 346.
Nephrolepis, 349.
Nerine, 370.
Sarniensis, 370.
Nerium, 526.
odorum, 526.

ORONTIACEÆ.

Nicandra, 309.
physaloides, 309.
Nictotiana,
tabacum, 308.
Nidularia, 633.
Nigella, 297.
Hispanica, 297.
Nolana, 314.
atriplicifolia, 314.
paradoxa, 314.
prostrata, 314.
NOLANACEÆ, 314.
Nothochlæna, 343.
NYCTAGINACEÆ, 303, 467.
Nyctanthes, 549.
arbor tristis, 549.
Nymphæa, 448.
cærulea, 448.
edulis, 448.
pubescens, 448.
rubra, 448.
stellata, 448.
versicolor, 448.
NYMPHÆACEÆ, 448.

OCIMUM, 550.
Basilicum, 550.
sanctum, 550.
Odontoglossum, 403.
Œnothera, 330, 591.
bistorta, 331.
Drummondi, 331, 591.
tetraptera, 330.
Olea, 529.
Capensis, 529.
Europæa, 263.
fragrans, 529.
grata, 529.
myrtifolia, 529.
OLEACEÆ, 263, 529.
ONAGRACEÆ, 282, 330, 591.
Oncidium, 401.
ampliatum, and others, [401
Onychium, 345.
Ophiopogon, 414.
Japonicum, 414.
Ophioxylon, 523.
serpentinum, 523.
Opuntia, 601.
ORCHIDACEÆ, 126, 386.
Oreodoxa, 361.
Origanum—
vulgare, 167.
Ornithogalum, 409,
caudatum, 409.
ORONTIACEÆ, 192, 415.

Orthosiphon, 550.
incurvus, 550.
stamineus, 550.
Osbeckia, 593.
Osmanthus, 529.
ilicifolius, 529.
Osmunda, 349.
OXALIDACEÆ, 242, 299, 462.
Oxalis, 299, 462.
bipunctata, and others, 462-63.
corniculata, 299.
rosea, 299.
tropæoloides, 299.
Valdiviana, 299.
Oxyanthus, 613.
hirsutus, 613.
Oxystelma, 532.
esculentum, 532.

PÆDERIA, 608.
fœtida, 608.
Pæonia, 454.
Palisota, 633.
PALMACEÆ, 184, 272, 355, 595.
Panax, 615.
cochleatum, and others, 615-16.
Pancratium, 373.
fragrans, and others, 373
PANDANACEÆ, 354.
Pandanus, 354.
odoratissimus, 354.
Papaver, 297.
Rhœas, 298.
somniferum, 297.
PAPAVERACEÆ, 297.
PAPAYACEÆ, 205.
PAPILIONACEÆ, 304, 471.
Pardanthus, 377.
Chinensis, 377.
Paritium, 443.
tiliaceum, 443.
Parkinsonia, 479.
aculeata, 479.
Parsonsia, 525.
corymbosa, 525.
Passiflora, 207, 433.
adiantifolia, 433.
alata, 433.
Buonaparteana, 433.
Chinensis, 433.
cærulea, 433.
cæruleo-racemosa, 433.
edulis, 207, 433.

Passiflora—
fœtida, 434.
Gontierii, 434.
holosericea, 434.
incarnata, 207, 434.
kermesina, 434.
laurifolia, 207, 434.
Loudoni, 434.
lunata, 434.
malifórmis, 207.
Middletoniana, 434.
minima, 434.
princeps, 435.
punctata, 435.
quadrangularis, 207, 435.
racemosa, 435.
rotundifolia, 435.
serratifolia, 435. &c.
PASSIFLORACEÆ, 207, 433.
Pastinaca—
sativa, 176.
Paullinia, 633.
Pavetta, 604.
diversifolia, and others, 604.
Pavonia, 633.
PEDALIACEÆ, 317.
Pedilanthus, 423.
tithymaloides, 423.
Pelargonium, 463.
Pellionia, 634.
Pentalinon, 527.
suberectum, 527.
Pentapetes—
Phœnicea, 294.
Pentas, 609.
carnea, 609.
Pentstemon, 580.
Peperomia, 634.
Pereskia—
aculeata, 601.
Bleo, 601.
Pergularia, 534.
odoratissima, 534.
Perilla, 316.
Nankinensis, 316.
Peristrophe, 576.
angustifolia, 577.
speciosa, 577.
tinctoria, 576.
Persea—
gratissima, 242.
Petalidium, 570.
barleriodes, 570.
Petræa, 558.
erecta, 558.
stapelia, 558.

Petroselinum—
sativum, 175.
Petunia, 307.
nyctaginiflora, 308.
Phœnicea, 308.
Phacelia, 314.
tanacetifolia, 314.
Phaius, 395.
maculatus, and others, 395.
Phalangium, 634.
Phalænopsis, 398.
amabilis, and others, 398—99.
Pharbitis, 311, 540.
Leari, 540.
limbata, 311.
Nil, 311.
Phaseolus, 477.
Caracalla, 477.
lunatus, 161.
multiflorus, 160.
vulgaris, 160.
PHILADELPHIACEÆ, 602.
Philadelphus, 602.
coronarius, 602.
Philageria, 634.
Philodendron, 634.
Phlebodium, 349.
Phlogacanthus, 574.
thyrsiflorus, 574.
Phlomis, 553.
leonurus, 553.
Phlox, 311, 541.
Drummondi, 311.
Phœnix—
dactylifera, 184.
sylvestris, and others, 361.
Photinia, 490.
dubia, 490.
Phyllanthus, 635.
Phyllarthron, 636.
Phyllotænium, 636.
Phrynium, 384.
dichotomum, 384.
Physalis—
Peruviana, 263.
Pierardia—
sapida, 213.
Pimenta—
vulgaris, 326.
PINACEÆ, 417.
Pinanga, 361.
Pinus, 417.
longifolia, 417.

PISONIA.

Pisonia, 467.
morindifolia, 467.
Pistacia—
vera, 278.
Pisum—sativum, 154.
Pitcairnia, 366.
Pithecolobium, 489.
dulcis, and others, 489.
PITTOSPORACEÆ, 456.
Pittosporum, 456.
Tobira, 456.
variegatum, 456.
verticillatum, 456.
Platystemon, 298.
Californicum, 298.
Plectocomia, 364.
Plectranthus, 550.
aromaticus 550.
Pleroma, 593.
trinervia, 593.
PLUMBAGINACEÆ, 542.
Plumbago, 544.
Capensis, and others, 544.
Plumieria, 525.
acuminata, 525.
alba 525.
Podocarpus, 421.
Chinensis, and others, 421.
Pogostemon, 551.
Patchouli, 551.
Poinciana, 480.
elata, 480.
Gilliesii, 480.
pulcherrima, 480.
regia, 480.
Poinsettia, 424.
albida, 424.
pulcherrima, 424.
Poivrea, 589.
coccinea, 589.
Roxburghii, 589.
POLEMONIACEÆ, 311, 541.
Polianthes, 406.
tuberosa, 406.
Polyanthus, 374.
POLYGALACEÆ, 444.
POLYGONACEÆ, 150, 467.
Polygonum, 467.
adenophyllum, 467.
POLYPODIACEÆ, 340, 594.
Polypodium, 343.
POMACEÆ, 250, 490.
Porana, 538.
paniculata, 538.
volubilis, 538.

PORTLANDIA.

Portlandia, 610.
grandiflora, 610.
Portulaca, 302, 466.
grandiflora, 302.
meridiana, 466.
POTULACACEÆ, 302, 466.
Potulacaria, 467.
Afra, 467.
Potentilla, 516.
Pothos, 415.
argyræa, and others, 415
Primula, 544.
auricula, 544.
polyanthus, 544.
veris, 544.
vulgaris, 544.
PRIMULACEÆ, 544.
Pritchardia, 362.
PROTEACEÆ, 470.
Prunus—
Armeniaca, 248.
Bokharensis, 250.
domestica, 249.
Psidium—
Cattleianum, 267.
Chinense, 267.
guajava, 266.
Guiniense, 268.
polycarpon, 268.
pumilum, 268.
sp., 268.
Psophocarpus—
tetragonolobus, 159.
Psoralea, 473.
Psychotria, 603, 636.
undata, 603.
Pteris, 345.
Pterospermum, 440.
lanceæfolium, 440.
Ptychosperma, 362.
Punica, 264, 570.
granatum, 264, 595.
nana, 595.
Pyrus—
communis, 253.
malus, 251.

QUAMOCLIT, 310.
phœnicea, 311.
vulgaris, 310.
Quassia, 461.
amara, 461.
Quisqualis, 591.
Indica, 591.

RANUNCULACEÆ, 297, 452.

RUELLIA.

Ranunculus, 453.
Asiaticus, 453.
Raphanus—
sativus, 148.
Rauwolfia, 523.
canescens, 523.
Ravenala, 379.
Madagascarensis, 379.
Ravenia, 636.
Reinwardtia, 461.
Renanthera, 397. [98.
coccinea, and others, 397,
Reseda, 293.
odorata, 293.
RESEDACEÆ, 293.
RHAMNACEÆ, 257.
Rhaphiolepis, 491.
Indica, and others, 491.
Rhaphistemma, 534.
pulchellum, 534.
Rhapis, 362.
Rheum, 150.
Rhisalis, 600.
salicornoides, 600.
Rhodanthe, 327.
maculata, 327.
Manglesii, 327.
Rhodea, 636.
Rhododendron, 458.
Rhodostoma, 612.
gardenioides, 612.
Rhyncospermum, 526.
jasminoides, 526.
Rivis, 601.
Richardia, 354.
Ethiopica, 354.
Ricinus, 425.
communis, 425.
Rivea, 540.
Bona nox, 540.
Rogiera, 610.
thyrsiflora, 610.
Rondeletia, 610.
punicea, 610.
Rosa, 491. [516.
alba, and others, 491-
ROSACEÆ 255, 491.
Roupellia, 528.
grata, 528.
Rubus, 255, 485.
albescens, 255.
rosæfolius, 255, 516.
Rudbeckia, 585.
triloba, 585. [570.
Ruellia, (See Strobilanthes),
maculata, 570.

RUMEX.

Rumex—montanus, 150.
Russelia, 580.
floribunda, 580.
juncea, 580.
Ruta, 461.
angustifolia, 461.
graveolens, 461.
RUTACEÆ, 460.

SABAL, 362.
Saccharum—
spontaneum, 25.
Saccolabium, 399. [399-400.
ampullaceum, and others,
SALICACEÆ, 422.
Salisburia, 274, 290.
adiantifolia, 274, 420.
Salix, 422.
Babylonica, 422.
Salpiglossis, 318.
sinuata, 318.
Salvia, 167, 316. 552.
angustifolia, 552.
coccinea, 552.
officinalis, 167.
patens, 316, 552.
splendens, 552,
Sanchezia, 577.
nobilis, 577.
Sanseviera, 407.
Capensis, 407.
Guineensis, 407.
SANTALACEÆ, 617.
Santalum, 617.
album, 617.
Sanvitalia, 325.
procumbens, 325.
SAPINDACEÆ, 210, 296, 444.
Saponaria, 301, 466.
Calabrica, 301.
officinalis, 466.
SAPOTACEÆ, 259, 489.
Saxifraga, 517.
sarmentosa, 517.
sp., 517.
SAXIFRAGACEÆ, 517.
Scabiosa, 323, 583.
atropurpurea, 323.
Schizanthus, 319.
Schizmatoglottis, 637.
Schizopetalon, 292.
Walkeri, 292.
Scilla, 408.
Scindapsus (*See* Pothos), 415.
Scorzonera—Hispanica, 171.
SCROPHULARIACEÆ, 318, 577.

SEAFORTHIA.

Seaforthia, 363.
Securidaca, 444.
Brownei, 444.
scandens, 444.
virgata, 444.
Selaginella, 339.
heterophylla, 456.
Senecio, 328.
elegans, 328.
Sericographis, 637.
Serissa, 603.
fœtida, 603.
Sesamum, 317.
Indicum, 317.
Sideroxylon, 521.
inerme, 521.
Silene, 301.
Armeria, 301.
pendula, 301.
pseudo-atocion, 301.
Simonisia, 637.
SIMABURACEÆ, 461.
Sinapis—alba, 148.
Smilax, 637.
SOLANACEÆ, 162, 307, 530.
Solandra, 531.
grandiflora, 531.
oppositifolia, 531.
Solanum, 531. [531-32.
argenteum, and others,
melongena, 164.
tuberosum, 162.
Solidago, 584.
Canadensis, 584.
Sollya, 456.
heterophylla, 456.
Sonerila, 593.
margaritacea, 593.
Sophora, 478.
tomentossa, 478.
violacea, 478.
Southwellia—
Balanghas, 277.
Sparaxis, 378. [378.
grandiflora, and others,
Sparteum, 472.
junceum, 472.
Spathiphyllum, 638.
Spathoglottis, Fortunei, 396.
Specularia, 321.
pentagonia, 321.
speculum, 321.
Sphenogyne, 326.
speciosa, 326.
Spilanthes, 325.
oleracea, 325.

TAGETES.

Spinacea—oleracea, 152.
Spiræa, 517.
corymbosa, 517.
nutans, 517.
Spondias—dulcis, 241.
mangifera, 242.
Sprekelia, 368.
Stachytarpheta, 554.
Jamaicensis, 554.
mutabilis, 554.
Orubica, 554
Stanhopea, 401.
Stapelia, 538.
Statice, 542.
duriusculo, 542.
Stephanophysum, 570.
Baikiei, 570.
repens, 570.
Stephapotis, 534.
floribunda, 534.
Sterculia, 439.
coccinea, 439.
STERCULIACEÆ, 208, 277, 294, 439.
Stevensonia, 363.
Stigmaphyllon, 446.
periplocifolium, 446.
Stipa, 289.
pennata, 289.
Strelitzia, 379.
angustifolia, 379.
regina, 379.
Strobilanthes, 570.
auriculata, and others, 570
Stylocoryne, 611.
Weberi, 611.
Sutherlandia, 474.
frutescens, 474.
Swainsonia, 474.
galegifolia, 474.
Swietenia, 459.
Mahagoni, 459.
Syringa, 530.
vulgaris, 530.
Syzygium—
Jambolanum, 269.

TABERNÆMONTANA, 523.
amygdalifolia, and others, 523—24.
Tacsonia, 435.
mollissima, etc., 435-36.
pinnatistipula, 404.
Tagetes, 325.
erecta, 325.
patula, 326.

TALAUMA.

Talauma, 450.
pumila, 450.
TAMARICACEÆ, 436.
Tamarindus—
Indica, 245.
Tamarix, 436.
dioica, 436.
Gallica, 436.
TAXACEÆ, 274, 420.
Taxus, 421.
Tecoma, 566.
grandiflora, and others, 566—67.
Tephrosia, 473.
candida, 473.
Terminalia—
Catappa, 281.
TERNSTROMIACEÆ, 446.
Tetranema, 580.
Mexicana, 580.
Thea, 447.
Chinensis, 447.
Thevetia, 523.
nereifolia, 523.
Thibaudia, 603.
setigera, 603.
Thrynax, 363.
Thuja, 419.
orientalis, and others, 419
Thumbergia, 318, 568.
alata, 318.
fragrans, 568.
grandiflora, 568.
laurifolia, 568.
Thunia, 395.
Bensonii, 395.
THYMELACEÆ, 469.
Thymus—
serpyllum, 168.
Tigridia, 377.
Pavonia, 377.
TILIACEÆ, 210.
Tillandsia, 366.
Tolpis, 330.
barbata, 330.
Torenia, 581.
Asiatica, 581.
sp., 581.
Tradescantia, 414.
discolor, 414.
Tragopogon—
porrifolius, 171.
Trapa—bicornis, 282.
Tribulus, 461.
cistoides, 461.
lanuginosus, 461.

TRICHOMANES.

Trichomanes, 347.
Trichosanthes anguina, 139.
diœca, 139.
Triphasia—trifoliata, 225.
TROPÆOLACEÆ, 294, 440.
Tropæolum, 294, 440.
majus, 294.
peregrinum, 295.
Tulipa, 404.
Tupistra, 413.
maculata, 413.
Turnera, 437.
triomiflora, 437.
ulmifolia, 437.
TURNERACEÆ, 437.
Tweedia, 533.
cærulea, 533.
Tydæa, 638.

URANIA, 379.
speciosa, 379.
Uraria, 475.
macrostachya, 475.
picta, 475.
Urena, 441.
lobata, 441.
Urtica, 422.
pulchella, 422.
salicifolia, 422.
URTICACEÆ, 422.
Uvaria, 638.

VACCINIACEÆ, 603.
VALERIANACEÆ, 322, 582.
Vallota, 369; purpurea, 369.
Vanda, 396.
Batemanni, 396.
Vangueria—
edulis, 271.
Vanilla, 126, 402.
albida, and others, 402.
aromatica, 126.
planifolia, 126.
Venidium, 329.
calendulaceum, 329.
Verbascum, 319.
Verbena, 316, 554,
Bonariensis, 554.
venosa, 554.
VERBENACEÆ, 316, 553.
Verschaffeltia, 363.
Viburnum, 615.
dilatatum, 615.
macrocephalum, 615.
Victoria, 449.
regia, 449.

ZYGOPHYLLACEÆ.

Vinca, 524.
alba, 524.
major, 524.
racea, 524.
Viola, 290, 436.
odorata, etc., 436.
tricolor, 290, 436.
VIOLACEÆ, 290, 436.
Virgilia, 479.
aurea, 479.
Capensis, 479.
Viscaria, 301.
oculata, 301.
rosa-cœli, 301.
VITACEÆ, 221, 455.
Vitis—vinifera, 221.
Vriesia, 638.

WEIGELA, 614.
rosea, 614.
Wendlandia, 609.
exerta, 610
paniculata, 609.
Whitlavia, 314.
gloxinioides, 314.
grandiflora, 314.
Wigandia, 542.
Vigieri, 542.
Wistaria, 473.
Sinensis, 473.
Wrightia, 526.
antidysenterica, 526.
coccinea, 526.

XANTHOCCHYMUS—
pictorius, 216.
Ximenesia, 325.
enceloides, 325.
Xylophylla, 428.
angustifolia, 428.
elongata, 428.

YUCCA, aloifolia, gloriosa, stricta, 408.

ZAMIA, 364.
Zea—Mays, 122.
Zephyranthes, 368.
Zingiber—officinale, 123.
ZINGIBERACEÆ, 123, 380.
Zinnia, 324.
elegans, 324.
pauciflora, 324.
Ziziphus—
jujuba, 258.
vulgaris, 257.
ZYGOPHYLLACEÆ, 461.

INDEX TO NATIVE NAMES OF PLANTS.

AGHIA GHASS.

Aghia Ghass, 351.
Akrôt, 277.
Aloo, 162.
Aloocha, 249.
Am, 236.
——— Archâee, 238.
——— Armân, 239.
——— Asmantarah, 239.
——— Bâtâvee, 239.
——— Bêl, 238.
——— Bhutoora, 238.
——— Bindobunnee, 238.
——— Bôgul, 239.
——— Booree, 239. [239.
——— Chchâeton Moora,
——— Chuckchukeea, 238.
——— Feroghabunnee, 238.
——— Gopâl Bhôg, 237.
——— Kâla Puhâr, 239.
——— Kelooâ, 239.
——— Kheera Chota, 239.
——— Kôput Bunga, 239.
——— Kuchchâee Meethea, 239.
——— Kysapatee, 237.
——— Langera, 237.
——— Mohun Bhôg, 239.
——— Mookh-Muchee, 239.
——— Nâgroo, 238.
——— Narecch, 239.
——— Pheeta Khâs, 239.
——— Phoolee, 239.
——— Phreet, 239.
——— Pyârâ-khâs, 239.
——— Shâh-Pusund, 239.
——— Soondâlea, 239.
——— Soondershaw, 238.
——— Surees, 239.
——— Surees-Khâs, 239.
——— Târâh, 239.
Amlâ, 199.
Ananâs, 185.
Anâr, 264, 570.
Aroo, 245.
Aroo Bokhâra, 250.
Ashphul, 213.
Asoca-Britch, 484.
Atâ, 217.

BABOOL, 488.
Badâm, 281.
Bâer, 257.

BAKUL.

Bâkul, 521.
Barhal, 198.
Bâlâ, 442.
Bâns, 350.
Batâvee, Neeboo, 231.
Bêgoon, 164.
Bêg-Poora, 235.
Bêl, 548.
Bêla, 548.
Bêl-phul, 227.
Bêt, 357.
Bhooin Chumpa, 381.
Bhoota, 122.
Bihee, 250.
Bilâetee Begoon, 164.
Bilâetee Gâb., 261.
Belâetee Halim, 140.
Bilâetee Imlee, 208.
Bilâetee Mênhdee, 596.
Bilâetee Nona, 218.
Belâetee Soot Moolee, 131.
Bilâetee Umrâ, 241.
Bilimbee, 243.
Bukâyun, 459.
Buko, 474.
Burbutee, 157.
Busuntee, 461.

CHABUK-CHHURKE, 532.
Châl Koomra, 136.
Chândnee, 523.
Châri-koni-seem, 159.
Cheenee Badâm, 280.
Cheenee Kumrunga, 212.
Cheenee Nurun a, 225.
Cheronjee, 279.
Chichinga, 139.
Chooee-mooee, 487.
Choopree Aloo, 132.
Chukandar, 152.
Chukôtura, 231.
Chulta, 220, 452.
Chumbêlee, 547.
Chumpa, 451.
Chundro moolik, 586.
Chundun, 615.

DAD murdun, 482.
Dêphul, 198.
Dêsee Akrot, 275.
Dêsee Badâm, 281.
Dhâo, 519.

JUWA.

Dhâree, 519.
Dheuroos, 149.
Dhootura, 308, 581.
Domootee, 300.
Doob, 24.
Doopahârya, 294.
Do-rungee, 510.

GAJUR, 176.
Gau-putta, 541.
Gênda, 325.
Ghoyân, 122.
Gool, 491.
——— Dâodee, 586.
——— Kesh, 304.
——— Khaira, 441.
——— Menhdee, 299.
——— Mukmul, 303.
——— shub-bo, 406.
——— -i-anâr, 595.
——— -i-ubbâs, 468.
——— -i-cheen, 523.
——— -i-ujâib, 441.
——— -i-ushrufee, 461.
Goolab, 491.
Goolâb Jâm, 270.
Goolâl Toolsee, 550.
Gundha râj, 612.
Gundhun, 130.
Gungchee, 478.
Gurâniya Aloo, 132.
Gurhul, 442.

HALEKM, 142.
Hâr-Singhâr, 549.
Hijlee-Budâm, 278.
Huldee, 124.
Hurkut, 573.

IMLEK, 245.

JAIT, 76.
Jâmun, 269.
Jârul, 520.
Jâtee, 547.
Jâu, 436.
Jeea-seem, 149.
Jhinga Toorooee, 135.
Jhoomka, 444.
Jooee, 546.
Jumrool, 271.
Juwâ, 442.

KAITHA.

KAITHA, 226.
Kagzi Neeboo, 233.
Kâjoo, 278.
Kâla dânâ, 311.
Kâminee, 458.
Kâsh, 25.
Kheera, 136.
Kêla, 188.
——— Cheenee Chumpa, 190.
——— Chumpa, 190.
——— Daccâee, 190. [190.
——— Daccâee Martaban,
——— Kuntêla, 190.
——— Kutch, 191.
——— Mâhl-bhôg, 191.
——— Martaban, 190.
——— Mohun-bhôg, 191.
——— Râm, 191.
Keôrâ, 354.
Kêtukee, 354.
Khajoor, 184.
Khirnee, 261.
Khopra, 272.
Khum Aloo, 132.
Khamach, 657.
Khumb, 122.
Khura-Peel, 509.
Khurbooza, 199.
Khutta Neeboo, 233.
Kobee, 142.
Kool-phul, 257.
Koosoom, 330.
Koozea, 515.
Korna Neeboo, 234.
Krishn churun, 480.
Kuchnâr, 485.
Kuchoo, 123.
Kudoo, 136.
Kuhwa, 604.
Kukree, 137.
Kumla Neeboo, 227.
Kumrunga, 242.
Kund, 547.
Kunêl, 526.
Kuntul, 196, 275.
Kunwul, 277, 450.
Kurêla, 135.
Kurônda, 262.
Kurun Phool, 458.
Kuth Bêl, 226.
Kuth Bêla, 547.

LAL JUMLOOL, 271.
Lâl Koomra, 139.
Lâl Murich, 162.
Lâl Sâg, 151.
Lâokee, 136.
Lehsoon, 129.

LOBEEA.

Lôbeea, 157.
Lông, 596.
Lutqua, 213.

MALAKA UMROOL, 270.
Mâlutee, 526.
Mâlsuree, 521.
Meeta Neebo, 234.
Mênhdee, 519.
Mesta, 209.
Môgra, 548.
Môm phulee, 280.
Moolee, 148.
Moorgha, 304.
Mootho, 24.
Môtiya, 548.
Mudâr, 582.
Mukhun seem, 156.
Mukkâ, 122.
Murich, 162.
Mutter, 154.

NAGSURA, 447.
Narial, 272.
Nâshpâtee, 253.
Neeboo, 225.
Nôna, 218.
Nuree, 199.
Nurikelee Kool, 258.
Nurphul, 199.
Nurungee, 227.

OOLOO, 25, 32.

PHATA-MUNDUR, 476.
Pâlak 152.
Pâluk jooee, 608.
Pânee Koomra, 136.
Pânee-phul, 282.
Pân kupoor, 458.
Pâprâ, 613.
Pavandi Bear, 258.
Peeyâi, 128.
Peetercelee, 175.
Pepiya, 905.
Phâlsâ, 210.
Phool Kobee, 145.
Phoontee, 204.
Phulâee, 487.
Phurâs, 436.
Pista Budâm, 278.
Podeena, 166.
Poee, 153.
Pucha-pat, 551.
Pudum, 450.
Pulwul, 139.
Puneeâla, 206.
Putwa, 209.
Pyâra, 266.

ZURD KUNEL.

RARBEL, 548.
Râee, 148.
Râm Kêla, 191.
Râm phul, 218.
Râm torooee, 149.
Rêndee, 425.
Rukto Gurâniya Aloo, 132.

SAG, 151.
Sâda-jumai-puli-seem, 159.
Salâd, 172.
Sêb, 251.
Seem, 159.
Seeta-phul, 217.
Selgum, 147.
Sêotee, 515.
Shäh-toot, 194.
Shukur-kund, 165, 540.
Shureefa, 217.
Singhâra, 282.
SIRISS, 488.
Sook-durshun, 370.
Sooltâna Chumpa, 447.
Soopâri, 356.
Soorgee, 216.
Sooruj Mukhee, 323.
Soosnee Aloo, 132.
Soot Moolee, 130.
Sufree Am, 266.
Sufuree Koomra, 139.
Suhujna, 140.
Sungtura, 227.
Sunko juta, 475.
Suringee, 216.

TALGACH, 184.
Til, 317.
Tipâree, 263.
Toolsee, 550.
Toomul, 216.
Torooee, 135.
Toot, 194.
Turbooza, 204.

UDRUK, 123.
Ukul-bhâr, 385.
Umrâ, 242.
Umroot, 266.
Umultâs, 481.
Ungoor, 221.
Unjeer, 194, 266.

WOONDKE, 216.

ZAFRAN, 378.
Zurd Aroo, 248.
Zurd Kunêl, 528.

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